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SCIENCE AND LEARNING IN FRANCE





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WITH A SURVEY OF OPPORTUNITIES
FOR AMERICAN STUDENTS IN
FRENCH UNIVERSITIES

*AN APPRECIATION
BY
AMERICAN SCHOLARS*



THE SOCIETY FOR
AMERICAN FELLOWSHIPS IN FRENCH UNIVERSITIES
1917

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JUL 10 1918

TO
THE SCHOLARS OF FRANCE
WORTHY CUSTODIANS
OF THEIR COUNTRY'S INTELLECTUAL GREATNESS
THIS VOLUME
PREPARED IN A TIME
WHEN FRANCE HAS REACHED
THE HEIGHTS OF MORAL GREATNESS
IS OFFERED
WITH HEARTFELT ADMIRATION AND SYMPATHY
IN THE NAME OF
THE SCHOLARS OF AMERICA

PREFACE

Our purpose in this volume is, primarily, to put before the American public the contributions of France in all fields of scientific knowledge, and to show her status in the forefront of the world's progress; and, in addition, to furnish to American university students all information bearing on graduate work in France.

Each chapter sets forth briefly, for a particular field:

1. The record of French scholarship during the past century; the notable achievements; the eminent leaders; the special lines of development; in general, the share of France in the world's progress;

2. The courses of instruction given, now or recently, at the universities of France, particularly at the University of Paris; the names of the most important scholars, with mention of their principal contributions and of the special fields of research over which they preside;

3. The facilities available for study and research, including the libraries, laboratories, archives, and museums, the auxiliary institutes, special schools, and learned societies and committees.

There is also:

An Introduction, describing the general intellectual spirit of France and Paris, and the interest and attractions that capital and country offer to the foreign scholar; and

An Appendix, describing the organization of French universities, the standards of preparation expected of the student, the system of degrees, the customs as to residence and attendance, the regulations as to fees and the like; and other facts useful to the visiting student.

The book has been made possible by the liberality of the Society for American Fellowships in French Universities, which has borne all the expense of publication.

The ultimate and cardinal mission of the book will be an act of homage to French science. Let the scholars of France know that their American colleagues are eager to pay this just tribute! The great place of France in the world of knowledge — the place that it always has held and always will hold — can never be forgotten by their debtors on this side of the ocean.

The men who wrote this book are qualified to speak on their subjects; a glance at their names will show that their word is decisive. They represent American scholarship. They have spoken frankly, sincerely, and judiciously, without reserve or exaggeration.

Their message goes out to the American people. May it convey some fresh light to our fellow-countrymen, and help to fix in their conviction the true status of French learning in the world!

This book was planned and begun towards the end of the year 1915; and in presenting it now, when the bonds of mutual esteem and gratitude between France and America have been drawn even more closely, the Authors believe that they are not only pointing the youth of our country to splendid sources of knowledge and wisdom, but are also serving, in the measure of their ability, to strengthen and confirm that comradeship of scholars which symbolizes the enduring friendship of the two nations.

THE EDITOR.

June, 1917.

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INTRODUCTION
THE MIND OF FRANCE
THE INTELLECTUAL INSPIRATION
OF PARIS



THE THINKER
(Rodin's Statue at the Entrance to the Pantheon)

THE MIND OF FRANCE¹

In the eighteenth and nineteenth centuries, France produced a large number of great masters in all fields of thought — in literature, science, and the arts. She thus kept abreast of all intellectual progress in Europe, and often led the way.

These great men were usually skilful teachers as well as creators and discoverers; so that they had worthy disciples — groups of younger scholars who spread abroad the masters' ideas, and prolonged their influence by adding the needed interpretations and modifications. In many fields, the works of these French leaders set standards not only for France, but for the world.

Their intellectual work possessed, as a rule, certain qualities which characterize the French mind, such as broad sympathy, constructive imagination, and a tendency to prefer the concrete or realistic to the abstract, and fact to speculation. These intellectual characteristics of the French have proved to be extraordinarily permanent, abiding generation after generation, and surviving immense political and social changes. The French scholar is apt to be an open-minded man, receptive toward new ideas, and an ardent lover of truth fluent and progressive. The French scientists have rarely been extreme specialists, narrow in their interests and their chosen objects. They have recognized that no science can be pursued successfully in isolation; its affiliations and adjuncts must also be studied. They have not been subdued

¹[By CHARLES WILLIAM ELIOT, emeritus President of Harvard University.—Ed.]

by the elaborate sorting and compiling machinery of modern scholarship.

The French people under all their forms of government — monarchical, imperial, or republican — have always shown cordial appreciation of intellectual achievements, and particularly of scientific investigation in philology, history, physical science, biology, sociology, and law. They place high among their national heroes their great scholars, writers, artists, and scientists. This popular appreciation has given vitality and enduring national influence to French scholarship in a great variety of fields.

All French masters in science and literature have had the advantage, in expounding and communicating the fruits of their labors, of expressing themselves in the French language, which lends itself to elegance and clearness, and to nice discrimination and perfect accuracy in statement. It is well-nigh impossible for teacher or expounder to be clumsy, obscure, or disorderly in the French language. Indeed, many of the most profound French philosophers and investigators have also exhibited a high degree of literary skill. A French style may be exaggerated, redundant, or diffuse, but it never fails to be clear. The French language, therefore, has been of great advantage to the French masters of thought, and through them to all the students who follow them — native or foreign.

To an unexampled degree the spirit of liberty has animated all the French leaders and schools of thought for two centuries. For them intellectual inquiry has been free. This is true not only in the field of social and political ideas and the philosophy of government, but also in the institutions intended to promote the development of science, literature, and art. The French Academies of Science and Letters all illustrate it, and so do the noble

professional traditions in French Courts of Justice and the French Bar, both the Courts and the Bar having set high examples of courage, independence, and bold insistence on judicial and professional privileges. Science, letters, and art in France have always shared, and often enkindled, the people's love of freedom and their passionate advocacy of democracy.

American students, thinking to take advanced studies in Europe, have often in times past supposed the French to be an inconstant, pleasure-loving, materialistic people. They have now learned through the Great War that the French are an heroic people, constant to great political and social ideals, a people intelligent, fervid, dutiful, and devoted to family, home, and country. They have also come to see that the peculiar national spirit of France is one of the great bulwarks and resources of civilization, which ought to be not only preserved, but reinforced.

Cambridge, 4 May, 1917.

THE INTELLECTUAL INSPIRATION OF PARIS¹

That delightful American humanist, George Ticknor, whose Spanish library is one of the literary treasures of Boston, has given us in his *Life and Letters* an admirable picture of the University of Göttingen a century ago. The University of Berlin had just been founded, and the characteristics that were to mark this essentially modern German city were as yet unknown. Goethe still reigned at Weimar, and the academic calm of the university towns was a fit environment for the study and investigation that made them famous. Still wrapped in an atmosphere of classicism, they were about to feel the quickening spirit of the physical sciences, and to embark upon that rapid advance which has brought wealth and prosperity to modern Germany. Yet Humboldt, the cosmopolite, who epitomized the nascent science of his native land, still lingered among the brilliant leaders of the Paris Academy, although yielding at length, with the deepest reluctance, to the royal command to share the king's table at Potsdam.

Ever since that day of high ideals, when Goethe and Schiller talked in the quiet gardens of Jena or crossed the Alps to join the literary colony of Rome, the universities of Germany have drawn to their hospitable halls the students of the United States. To these

¹[By GEORGE ELLERY HALE, Foreign Secretary of the National Academy of Sciences, Correspondent of the Institute of France.—Ed.]

institutions we owe much of the regard for scholarship and much of the spirit of research that now characterize our own universities. Wolcott Gibbs at Harvard, in 1863, and Gilman at Johns Hopkins, in 1876, definitely fixed in our advanced courses the laboratory methods they had learned in Germany. Since their time, in a rapidly widening circle of universities, research leading to the doctor's degree has become universal, greatly to the advantage of American science. No faculty member, if perchance half-hearted in his desire for new knowledge, can afford to ignore completely the growing custom of original research. To be most successful as a teacher he must be counted among those who realize that inspiration springs from advancing knowledge — not from the sealed books of the Aristotelian, whose pedantic vision, which paralyzed progress in the past, would be no less deadly at the present day if the spirit of research were destroyed.

The influence of the German university on American education has thus been of incalculable value. It has taught the student to look beyond the bachelor's degree to the possibility of advancing knowledge by his own efforts, and to realize the high privilege of never-ceasing research. It has also taught him the advantage of foreign travel and experience, needed so imperiously in the midst of our slowly decreasing insularity. But, in working so much of good, it has almost inevitably involved an element of harm, by centering our educational ideals too exclusively in a single country. The time has surely come to look farther afield. And in widening our vision, the great debt we already owe to the *École des Beaux Arts* is an ample assurance of the rich benefits we may reasonably hope to derive from the other schools of France.

When Ticknor sailed from Boston in 1815, the Paris Academy of Sciences was near the zenith of its fame.

Never in the history of Europe had so brilliant a company of scientific men concentrated in one spot the superb productions of their genius.¹ Alexander von Humboldt, contrasting Paris and Berlin at a later period, characterized the latter as "an intellectual desert, an insignificant city devoid of literary culture." Goethe, too, longed for the intellectual joys of Paris. Writing to Eckermann in 1827, he said:

"Truth to say, we all lead a miserably isolated existence. We meet with but little sympathy from the common herd around us, and our men of genius are scattered over Germany. One is at Vienna, another at Berlin, a third at Königsberg, a fourth at Bonn or Düsseldorf — all separated by some hundreds of miles, so that personal intercourse and a *viva voce* interchange of thought is a matter of rare occurrence. I am vividly impressed with the keen enjoyment this would yield when I am in the company of men like Alexander von Humboldt, who in one day carry me farther toward all I am seeking and yearning to know than I could attain during years of solitary study.

"Only imagine, however, a city like Paris, where the cleverest heads of a great kingdom are grouped together in one spot, and in daily intercourse incite and stimulate each other by mutual emulation; where all that is of most value in the kingdoms of nature and art, from every part of the world, is daily open to inspection; and all this in a city where every bridge and square is associated with some great event of the past, and where every street-corner has a page of history to unfold. And withal not the Paris of a dull and stupid age, but the Paris of the nineteenth century, where for three generations such men as Molière, Voltaire, and Diderot have brought into play a mass of intellectual power such as can never be met with a second time on any single spot in the whole world."

It would be easy to fill this book with distinguished eulogies of French culture, of the clearness and pre-

¹ See the present writer's "National Academies and the Progress of Research," *Science*, November 14, 1913.

cision of French thought and expression, of the optimism and charm of French life,—qualities that still remain the dominant characteristics of the civilization of France.

The intellectual growth that reached its finest flower in the days of the First Empire was deeply rooted in a scholarly past. Under the sheltering walls of Notre Dame a colony of students rose into view in the twelfth century, and soon outgrew the confines of the Island of the City. Within a few decades the University of Paris had assumed definite form in its present locality, and its fame drew students from all quarters of the civilized world. The provinces were not without their schools of higher education, some of which attained great distinction. But the concentration that has both helped and hindered France focused in Paris the intellectual life of the nation. Favored by the Court, sharing the prestige which made and maintains the French language as the medium of diplomacy, and fostered by the world's approval, the higher spirit of France grew apace. Never in the world's history, excepting the single case of Alexandria, has one city sheltered so much of a nation's intellectual greatness. Woven for centuries into the fabric of the national life, it still finds expression in that high civilization which is so universally admired. And its appreciation by the State, generally withheld in other lands, is visibly demonstrated to every visitor to Paris.

If you would feel the inspiration of a great nation's centuries of thought and brilliant expression, go to the Luxembourg Gardens on a bright summer's afternoon. From this center you may set out to observe, as in no other region of the world, the widely recorded evidences of intellectual progress.

We are in the midst of the greatest of all wars, and the roar of the heavy guns at Verdun and on the Somme is almost audible. The nation has been stripped of

able-bodied men to defend its frontier, and the crowd that still returns to these pleasant gardens, to rest among beds of flowers and pools of water, is made sombre by the ever-present marks of mourning. Yet the children, who must carry on the great traditions of France after the war has ended, mercifully spared the depression which their elders so bravely conceal, sail their boats across the pond as in happier days. A string orchestra, with many women now among its musicians, draws a group about it beneath the trees. In spite of the war the old life of Paris still goes on.

Encircling the pool, and stretching away on all sides, the busts and statues of eminent men look out of the past. Even the light reflected from the windows of the palace tells of great discoveries. For on a winter's day in 1808, while looking at one of these windows through a piece of Iceland spar, Malus detected for the first time that remarkable property of light — its polarization by reflection — which aided greatly in the establishment of the wave theory by Fresnel.

To our left rises the great dome of the Pantheon, inscribed "*Aux grands hommes la patrie reconnaissante*," enshrining the tombs of Hugo, Lagrange, and Bougainville, and testifying, in the mural decorations of Puvis de Chavannes and in Rodin's "*Le Penseur*," to the perennial flow of French genius. Here, in 1851, Foucault suspended from the lantern of the dome an immense pendulum which, swinging in an unchanging plane as the floor turned beneath it, made visible the rotation of the earth. Close at hand stands the Bibliothèque de Sainte-Geneviève, with its rich collection of manuscripts and early printed books; flanked by the École de Droit, fronting on the broad Rue Soufflot. Book shops are everywhere, devoted to law or to medicine, to history, art or science, to theology or belles-lettres. On all sides

the achievements of French civilization are honored or offered for public service.

Beyond the pond, the garden extends toward the south in the long rectangle of the Avenue de l'Observatoire. Crossing the Rue Auguste Comte, we leave the children's area behind, and watch the vista down the long rows of clipped horse-chestnuts. In May they are superb in their white wealth of blossoms, and now in early September, though their leaves are rusting, the effect of skilful massing is still retained. Beyond the Rue Herschell and the Rue Cassini rises the great stone structure of the Observatory, the domes at its two extremities coaxial with the alleys of trees. Built under Louis XIV by Claude Perrault, physician and architect, its lofty façade speaks eloquently of the enlightened appreciation of pure science which France has always shown. Here, during its early years, was housed the Academy of Sciences, and Leclerc has recorded for us in one of his engravings a visit of Louis XIV to the members assembled in the Observatory.

Four generations of the house of Cassini succeeded to the directorate of the Observatory, first held in 1671 by Giovanni Domenico Cassini, discoverer of the four Saturnian satellites and of the well-known division in Saturn's ring. Among their successors were Arago, the brilliant Perpetual Secretary of the Paris Academy of Sciences, and Le Verrier, Senator of France, whose immortal researches on the irregular motions of Uranus led in 1846 to the discovery of Neptune. The statue of Le Verrier before the Observatory, and that of Arago in the Boulevard Arago, were erected by national subscription.

The same fine sense of fitness which has given the streets about the Observatory the names of great astronomers is repeatedly illustrated in adjoining regions of

Paris. The broad area of the Jardin des Plantes, extending to the Seine, is bounded by the Rue Cuvier, the Rue de Buffon (named for the first director of the Garden), and the Rue Geoffroy St.-Hilaire. The vast menagerie, gardens, and exhibits, including the herbaria of Lamarck and Alexander von Humboldt and Cuvier's celebrated collection of comparative anatomy, together with the statues of many eminent men of science, are not the only attractions of this home of the naturalist. Here in a small laboratory, where their original instruments may still be seen, four generations of the family of Becquerel have carried on their classic investigations. Most significant of these is the discovery by Henri Becquerel, in 1896, of the invisible radiations of uranium, the starting point of research in radioactivity.

Were we to attempt to mention here even a tithe of the laboratories, the schools, the great names, or the fundamental contributions to knowledge, which press for recognition in all points of the Latin Quarter, these introductory pages would be multiplied beyond the reader's patience. But as we pass from the Jardin des Plantes through the Rue de Jussieu or the Rue Linné toward the core of France's scholastic heart, our gaze is often diverted. Across the Place Monge rises the École Polytechnique, flanked by the Rue Descartes and the Rue Laplace. Farther on we reach the Collège de France and the great pile of the Sorbonne. The statue of Claude Bernard before the College must appeal to every scholar; for his "Introduction à l'étude de la médecine expérimentale," unfortunately veiled from workers in other fields by its medical title, is one of the classics of science. Here, in the crystalline clearness of perfect French, devoid, in large part, of professional details, the general principles of scientific research are superbly presented.

No investigator unfamiliar with this great work should leave it long unread.

If we elect to enter the Place de la Sorbonne through the Rue Champollion, a fascinating chapter in the history of science will rise before us. For the erudition of Germany in the field of Egyptology all goes back to the achievements of Champollion, first to decipher the royal cartouches on an obelisk and to read the trilingual inscription of the Rosetta Stone. Napoleon (who invariably signed himself while in Egypt "Membre de l'Institut, Général en Chef") had paved the way for Champollion by taking to Cairo a brilliant company of men of science, who recorded in the great "Description de l'Égypte" the inscriptions of the Nile, while a French officer had found the Stone itself at the Rosetta mouth. Since these distinguished beginnings, the stirring traditions of French archaeology have been ably maintained by Mariette, Maspero, and their colleagues, both in Egypt and in France.

The Church of the Sorbonne affords a fitting entrance to the Sorbonne itself. The marble figure of Richelieu, beneath his cardinal's hat suspended from the ceiling, marks the tomb of the founder of the Académie Française and the builder of the Sorbonne. His private library, with many other valuable collections of early books and manuscripts, is still preserved; while the stimulus he gave to letters by his creation of the French Academy was soon emphasized in other fields by Colbert, under whom the Académie des Sciences, the Académie des Beaux Arts, and the French Academy at Rome were established. Colbert even conceived the plan of the Institute of France, but the Institute itself did not come into existence until after the Revolution.

The great amphitheater of the Sorbonne, with its superb mural paintings and its statues of Robert de

Sorbon (founder of the original hostel for poor students), Richelieu, Descartes, Pascal, Rollin, and Lavoisier, is the chief place for university functions. These six figures epitomize the many-sided achievements of French intellectual progress. Even Pascal alone embodies an exceptional range of activity; we find him again represented at the base of the Tour St. Jacques, which he is said to have ascended to repeat his experiments proving the decrease in the pressure of the atmosphere with increasing elevation. Each of these tempting names, which might furnish a text for long discourse, must be passed by in favor of one more recent, which for the student represents most truly the spirit of modern France.

Memories of Louis Pasteur are best recalled in the regions associated with his life and work. The broad Avenue de Breteuil, coaxial with the Hotel des Invalides, extends from the Tomb of Napoleon to the Boulevard Pasteur. At the center of the Place Breteuil stands the monument erected by France in Pasteur's honor. When it is remembered that by popular vote Pasteur was declared the greatest of Frenchmen, the national significance of this monument will be appreciated.

Pasteur's later work was done in the Institut Pasteur, which stands in the Rue Dutot, not far from the Boulevard Pasteur. Here also is his tomb. But the reader of his biography by Vallery-Radot — a book to which every young investigator, in whatever field of science, should go for inspiration and guidance — will remember with keenest pleasure those simple beginnings when Pasteur, an obscure student from the little village of Dôle, embarked upon his career of discovery. He was studying the crystals of racemic acid, intent only on the advancement of knowledge, and with no thought of practical ends, when he noticed a curious dissymmetry,

which had escaped even such skilled investigators as Mitscherlich and La Provostaye. Two crystals of precisely the same chemical composition were seen to be identical also in form, except in one respect: although the interfacial angles were the same, the two could not be superposed — the small facets were inclined in some cases to the right, and in others to the left. Carefully separated into two heaps and then dissolved, the two types of crystals in solution, though chemically identical, produced opposite effects on a beam of polarized light—one rotating it to the right, the other to the left. Mixed in equal parts, they caused no rotation.

This discovery, to the lay mind so valueless, excited Pasteur beyond measure. He rushed from the laboratory, and in the long alleys of the Luxembourg Gardens unfolded his vision of its consequences to his friend Chappuis. The constitution of racemic acid, formerly so mysterious, had been found; a new class of isomeric substances had been discovered; the phenomenon of rotatory polarization and the properties of crystals had been illuminated: in short, a new and unforeseen route had been opened in science. Biot, when Pasteur repeated the experiment for him, exclaimed: "*Mon cher enfant, j'ai tant aimé les sciences dans ma vie que cela me fait battre le cœur!*"

Beautiful as this discovery appeared to the veteran Biot, it was still more marvelous in its possibilities to Pasteur himself. For his powerful imagination carried him far beyond its immediate applications in chemistry and physics toward the still greater consequences that he already half divined. Eager to pursue the new path, he followed up his work. How is racemic acid produced? With the aid of Mitscherlich, Pasteur set out in hot haste for the chemical factories of Germany, Austria, and Bohemia. Everywhere he found traces of the acid

in tartrates. Returning to Paris, he succeeded in producing racemic acid experimentally, and incidentally won the Chevalier's ribbon of the Legion of Honor.

Twenty years later, as a direct consequence of these experiments on crystalline dissymmetry, arose the new science of stereochemistry, which tells us of the arrangement in space of the atoms constituting a molecule. But far more important, Pasteur's studies of racemic acid showed him that while one class of crystals would ferment, the others remained inert in the liquid. Why should this be? Because, he replied, "*Les ferments de cette fermentation se nourrissent plus facilement des molécules droites que des molécules gauches.*" But what, then, is fermentation, that strange process regarded by Liebig and others as a purely chemical phenomenon? The answer was immediately given by Pasteur, who showed it to be due to the presence of hosts of bacteria, which eagerly devoured one class of crystals and ignored the others.

Here was the beginning of that great study of putrefactive changes, and of the part played by bacteria in disease, which made the world Pasteur's debtor. Modern surgery, the cure of rabies, the germ theory of infection,—all go back to those simple experiments in pure science that laid the foundation of his career. What a privilege for the student to follow in his footsteps, to feel the stimulus of his example, to realize in some measure that high sense of devotion to truth, of obligation to humanity, best typified in Louis Pasteur!

But the fascination of Pasteur has tempted us far afield. Here in the Luxembourg Gardens, to which his talks with Chappuis have brought us back, we may well pause to reflect on the demands that the American student may fairly make on the country he elects for

university work. Paris, as Goethe and Humboldt declared, and as those who are acquainted with French scholars today will heartily reiterate, is full of intellectual opportunity and charm. The admirable courses of instruction offered in every department of knowledge are fully set forth in the present volume. If in some fields there is room for improvement of the facilities now available for research, we have the strongest assurances that these will be rapidly augmented. Thus, from the intellectual standpoint, the scholastic attractions of Paris should leave nothing to be desired.

But may not the student ask for more? May he not hope to find, in the country he visits for graduate study, the inspiring qualities of an advanced civilization, the high ideals of a nation devoted to progress in the finest sense? Let us test France from this viewpoint.

Glance at the past, and realize how deep-rooted is her culture. The courtliness and taste of the old régime, its refinements in art, the elegance of its literature, the lasting contributions to civilization made by its greater statesmen, still find expression in the life and institutions of Paris. And this rich heritage stands free from the defects of an earlier social structure and the aggressive ambitions of imperial days. France, fortunate among nations, has conserved the good and rejected the evil experienced in her national progress. The dark passions of the Revolution have utterly disappeared, giving place to the spirit of liberty, equality, fraternity, truly expressed in the national life, and uniting France and the United States by unbreakable bonds.

But the present, not the past, must determine the student's choice. Here he will not hesitate, for France stands, as all the world knows, at the highest level of her moral attainment. The baseless charge of decadence, the ignorant depreciation based on an imperfect

knowledge of the French people and an inability to perceive their deeper qualities—all this, occasionally heard in the past, has been forever silenced by the War, revealing a devotion to the State, a quiet but unyielding persistence in the defense of national ideals, which no opponent can overcome. The inspiring vision of war-swept France, indomitable in the face of sudden invasion, will draw to her universities in the coming days of peace many a student who would taste for himself the qualities he has admired and envied from the comfortable security of the United States.

PARIS, September, 1916.

ANTHROPOLOGY

ANTHROPOLOGY¹

The history of Anthropology, with its four subdivisions of Physical Anthropology, Prehistoric Archaeology, Ethnology, and Ethnography, can be traced in France perhaps better than in any other country of the world.

Physical Anthropology. This statement is especially true of Physical Anthropology. It was a French traveller, BERNIER (1625-1688) who first attempted to distinguish the races of mankind; this preceded the classification of LINNAEUS by over fifty years. BUFFON (1707-1788) was one of the first to insist that man was a single species. The "Transformism" of LAMARCK (1744-1829) was the first coherent theory of evolution. This hypothesis was supported by SAINT-HILAIRE (1772-1844), and attacked by CUVIER (1769-1832), who put forward "the catastrophic theory" as his solution of the question of the history of the animal world. Hair as the most perfect of the criteria of race was recognized as early as 1827 by SAINT-VINCENT and in 1858 by SAINT-HILAIRE. But it was not until 1863, when PRUNER BEY read his classic memoir before the Société d'Anthropologie, that the importance of this criterion for a classification of the races of man was fully realized.

Alfred Haddon² has called BROCA, TOPINARD, and DE QUATREFAGES the "Systematisers" of Anthropology. BROCA (1824-1880), the greatest of all physical

¹ [Drafting Committee: C. H. HAWES, Dartmouth College; A. M. TOZZER, Harvard University.— Ed.]

² A History of Anthropology," N. Y., 1910.

anthropologists, was the prime mover in the establishment of the Société d'Anthropologie de Paris in 1859 and of the École d'Anthropologie in 1876. His pioneer work on craniology led to his invention of numerous important instruments for this study. His work on the hybridization of the human species was the first study to be made of race-mixture. TOPINARD made valuable investigations on the living population of France, and his work "L'Anthropologie" (1876) has remained the standard text-book almost up to the present time. The third of the "Systematisers" was DE QUATREFAGES (1810-1892), professor of Anthropology in the Muséum d'Histoire Naturelle of Paris. He was an early champion of the much derided claim of man's great antiquity upon this earth. His book "L'Espèce humaine" (1877) was one of the first to take into account the importance of fossil forms of man.

A list of other French physical anthropologists and their interests should include DENIKER and his "Races et peuples de la terre" (1900); HAMY; COLLIGNON, in pigmentation and anthropometrical surveys; QUÉTELET, a pioneer of the biometric method; VERNEAU and his work on the Grimaldi and Cro-Magnon "races"; BOULE on the bones from La Chapelle-aux-Saints; and MANOUVRIER. Mention should be made here of the work of BERTILLON on the identification of criminals.

Prehistoric Archaeology. In the field of prehistoric archaeology, France has played the leading part. This is due to some extent to the rich field for archaeology to be found in France. It is significant that the current modern name of each of the periods of the palaeolithic culture in Europe is a French name associated with a site where typical forms of stone implements were found. The name of BOUCHER DE PERTHES stands out in this



PAUL BROCA (1824-1880)

ANTHROPOLOGY

field of prehistoric archaeology. His discoveries at Abbeville, in 1825, of the bones of extinct animals associated with flint implements led him to champion the cause of early man in France. It was not until 1859 that these finds were completely substantiated by the investigations of the English archaeologists, PRESTWICH, LYELL, and Sir John EVANS. The importance of this validation cannot be over-estimated in the history of prehistoric archaeology. COURMANT (who may be called the successor of Boucher de Perthes) and D'ACY have worked in the river-drift deposits.

We come next to the great period of cave man in the famous Dordogne district. Beginning with the classical discoveries at Les Eyzies by LARTET and his English companion, CHRISTY, we have a long series of names, including the father of prehistoric archaeology, GABRIEL DE MORTILLET, and his son, ADRIAN DE MORTILLET, MASSÉNAT, GIROD, and later the investigations, largely undertaken in concert, by l'Abbé BREUIL, CAPITAN, BOULE, VERNEAU, and PEYRONY. The Menton caves have been described by ABBO, RIVIÈRE, and CARTAILHAC. Mention should also be made of the work of ARCELIN at Solutré, MARTIN at La Quina, and CHAUVET near Angoulême. PIETTE stands out alone for his researches in the Pyrenees on the "painted pebbles" and the sculptures, and for his establishment of the genuineness of the palaeolithic cave paintings and etchings. The subventions of the Prince of Monaco made possible extensive recent excavations, the results of which are under the care of l'Abbé LAVILLE in the Musée Océanographique at Monaco.

As Boucher de Perthes was the vindicator of Quaternary man in France, l'Abbé BOURGEOIS stands as the champion of Tertiary man. The battle over the Eolithic question has been a warm one, and its center has been

in France. DESNOYERS in 1863 at Saint-Prest, l'Abbé BOURGEOIS in 1867 at Thenay, and RAMES in 1877 at Puy-Courny, are some of the protagonists. In spite of the efforts of the Belgian, RUTOT, to assume the onus of an affirmative solution, French scholars, led by BOULE, have, as a whole, refused to accept this answer.

The investigations in Neolithic France have been made by CHATELLIER in Brittany (1807) with his museum at Kernuz; BONSTETTEN, CUSSET, BAYE, l'Abbé HERMET, in the dolmens, and BERTRAND at Carnac. GUEBHARD, VIRÉ, BAUDOUIN, and JACQUOT, are a few of the others interested in the prehistoric monuments of France.

The Age of Bronze was first investigated in France by CHANTRE (1876) in the Rhône Basin. COUTIL is another name to note in this horizon. DÉCHELETTE, BERTRAND, COROT, and PIROUTET, are the names of some of those associated with investigations in the Iron Age.

It is impossible to speak of the large mass of literature on prehistoric France. Special mention should, however, be made of G. DE MORTILLET'S "Le Préhistorique" (1883), EDMOND'S "Musée Ostéologique" (1907), S. REINACH'S "Répertoire de l'Art Quaternaire" (1913), and DÉCHELETTE'S monumental work "Manuel d'Archéologie préhistorique" (3 vols. 1898-1912).

American Archaeology. It is perhaps significant of the wide interest taken in the subject of prehistoric archaeology by France to note that American archaeology has by no means been neglected. The only complete treatise on American archaeology is that of the late M. BEUCHAT, "Manuel d'Archéologie américaine" (1912). NADAILLAC has also written two books dealing with America. Middle American archaeology, and

especially the hieroglyphic writing, have been investigated by many French scientists. Among these are BRASSEUR DE BOURBOURG, CHARENCY, HAMY, DE ROSNY, PINART, and LEJEAL. Several French explorers have made extensive investigations in Central America. WALDECK, CHARNAY, and the Comte DE PÉRIGNY are among this number. The most famous of all Americanists is the Duc DE LOUBAT, who has established professorships in Mexican Archaeology at the Collège de France, at the University of Berlin, and at Columbia University. His masterly reproductions of many of the pre-Columbian and post-Columbian manuscripts have made these valuable documents available to students.

Ethnology and Ethnography. The investigations in these subjects started with the noble work of the Jesuit missionaries in Canada, South America, and Asia. Among other investigators in this side of anthropology are BUFFON; DE QUATREFAGES on the Pygmies; BOUGAINVILLE and D'ENTRECASTEAUX in the Pacific; DE BRAZZA, who opened up the French Congo; DUVEGRIER and SCHIRMER, in the Central Sahara; SOGONZAC, in Morocco; TILHO, at Lake Chad; and D'ORBINY, in South America.

Sociology. COMTE (1798-1857) was the founder of the modern science of Sociology. There is an illustrious list of French scholars interested in problems of Social Anthropology: GIRAUD-TEULON; LETOURNEAU on primitive marriage; DURKHEIM, HUBERT, and MAUSS, who have made "L'Année sociologique" famous; and TARDE.

Linguistics. All students of primitive languages are under obligations to ROUSSELOT for the invention of the Kymograph for recording sounds graphically. It is possible to speak of a few only of the French students

of primitive languages; René BASSET, for his work on Hametic languages, and FAIDHERBE, MASQUERAY, and MOTYLYNSKY on Berber, should be mentioned.

Instruction. Anthropological instruction is offered at the Collège de France under CAPITAN, who gives courses on Mexican archaeology; at the Muséum d'Histoire Naturelle, under VERNEAU, on the prehistoric races of Europe; at the École Pratique des Hautes Études à la Sorbonne, under MANOUVRIER, on physical anthropology, and under RAYNAUD, on the religions of pre-Columbian America; and at the École d'Anthropologie, under A. DE MORTILLET on ethnography, MAHOUDEAU on zoological anthropology, PAPILLAUT on sociology, VINSON on linguistics, HERVÉ on ethnology, CAPITAN, and MANOUVRIER.

Mention should be made also of the Oriental schools at Cairo, in Egypt; at Saigon, in Cochin China, and in Cambodia.

Field work in prehistoric archaeology is available, as in no other place in the world, in the river-drift and cave deposits of France. French investigators in this field have always shown a cordiality and welcome to foreign investigators. In taking into account the opportunities for work in prehistoric archaeology, it should be noted that, whereas formal instruction is seldom offered anywhere except in Paris, the extensive work of the scientific societies, which will be discussed later, is available to all properly accredited students.

Museums. France has more archaeological and anthropological museums than any other country in the world. In addition to the famous Musée des Antiquités Nationales, at Saint-Germain, there is the Musée d'Ethnographie, at the Palais du Trocadéro; the Muséum d'Histoire Naturelle; the department of Archéologie Celtique et Gauloise, at the Louvre; and the Musée de

l'École d'Anthropologie. There are no less than ninety archaeological museums in France, not to mention those in the French possessions.

Scientific Societies. France has the honor of having the oldest anthropological society, the *Société des Observateurs de l'Homme*, established in Paris in 1800. This was succeeded by the *Société ethnologique de Paris* in 1839. There followed the *Société d'Anthropologie* in 1859, the *Société d'Ethnographie* in the same year, the *Société américaine de France*, the *Société préhistorique*, the *Congrès préhistorique de France*, and the *Commission d'Étude des enceintes préhistoriques et fortifications antéhistoriques*, and the *Institut international d'Ethnographie et de Sociologie*. All these societies have valuable series of publications.

Mention should also be made of the inauguration at Nancy in 1875 of the *Congrès international des Américanistes*, which has had a long and prosperous history. There should also be noted the anthropological societies of Lyon and Bordeaux, together with no less than forty associations for anthropological or archaeological research scattered through France.

Scientific Publications. In addition to the publication of *Bulletins* and *Memoirs* by many of the preceding societies, there are a large number of scientific publications devoted to anthropology. Among these are the "*Revue anthropologique*," a continuation of the "*Revue d'École d'Anthropologie*"; "*l'Anthropologie*," one of the foremost anthropological publications in the world; "*L'Homme*"; "*Matériaux pour l'Histoire primitive et naturelle de l'homme*"; "*Revue d'Ethnographie*"; "*L'Ethnographie*"; "*L'Homme préhistorique*"; "*Revue des Études préhistoriques*"; "*Préhistorique de France*"; and "*Bulletin de la Commission archéologique de l'Indochine*."

Libraries. The libraries of the various institutions mentioned have large collections of anthropological material. The Bibliothèque de la Société des Antiquaires de France, at the Louvre, specializes in archaeology; and the Bibliothèque Nationale has probably the largest collection of original Mexican manuscripts of any institution in the world.

ARCHAEOLOGY
AND
HISTORY OF ART

ARCHAEOLOGY

AND

HISTORY OF ART¹

In the development of Archaeology from a "handmaid of Philology" into a definite science, with its own traditions and methods of procedure (which is one of the most characteristic achievements of the nineteenth century), French scholars have played an important part.

CHAMPOLLION's discovery of the key to the Egyptian hieroglyphic writing ranks first, perhaps, in the record of their achievements; but his is only one among many prominent names. In the same field of Egyptology, MARIETTE will always be remembered as the discoverer of the tombs of the Apis bulls and of many other monuments, and as the organizer of the great museum in Cairo. And the rapid advance in knowledge of ancient Egypt in recent years is very largely due to MASPERO, the learned and broad-minded Director General of the Department of Antiquities under the Egyptian government for many years before his death in June, 1916. The exploration of the Syrian region and the study of Semitic epigraphy and archaeology owe much to RENAN, though his great fame rests on his "Life of Jesus" and other works not strictly archaeological in character. In the fascinating story of research in Babylonia and Assyria, the work of BOTTA and PLACE in exploring the palace of Sargon at Khorsabad (the first of the great palaces of this region to

¹ [Drafting Committee: GEORGE H. CHASE, Harvard University; HAROLD N. FOWLER, Western Reserve University; A. L. FROTHINGHAM, Princeton University; J. R. WHEELER, Columbia University.—Ed.]

be excavated), and that of DIEULAFOY and SARZEC in the mound of Tello, occupy a prominent place; and the recent excavations of MORGAN at Susa and Persepolis have brought to light a mass of important material for the early history of the Orient. OPPERT, HEUZEY, and MÉNANT have led in elucidating this new material.

In the development of classical archaeology, also, the part played by French scholars is noteworthy, especially in the exploration of Greek lands. Even before the establishment of the modern kingdom of Greece, the *Expédition scientifique de Morée* in 1829 and 1830, under the leadership of BLOUET, collected materials for an elaborate publication devoted to the ancient ruins in the Peloponnesus, then very imperfectly known; and the explorations of TEXIER in Asia Minor in 1833-37 performed a similar service for the monuments of that region and supplemented the earlier work of English travelers.

New stimulus to such researches was given by the establishment, in 1847, of the *École française d'Athènes*, the first of the "foreign" schools in Athens, which served as a model for those established later by other nations in the capital of Greece. With this school most of the French classical archaeologists of the last half of the nineteenth century have at some time been associated. Members of the School have conducted many excavations in Greek lands, the most notable of which are those at Myrina (1880-82), at Delos (begun in 1873, and still in progress), and at Delphi (1892-97, with supplementary work in more recent years). Among the famous members of the School who are no longer living, mention may be made of Albert DUMONT, Director in 1875-78, a prolific writer on many aspects of ancient art, who in 1873-75 established the important French School of Archaeology in Rome; Olivier RAYET, explorer of the great temple of Apollo at Didyma in 1873 and

founder of the "Monuments de l'Art antique" (2 vols., 1881-83); and Georges PERROT, a critic of unusual acumen, joint author (with the architect CHAPIEZ) of the comprehensive "Histoire de l'Art," the tenth volume of which was published just before his recent death. Other notable scholars in this field were François LENORMANT, founder of the "Gazette Archéologique" (1875-89), a voluminous writer in many fields, who was famous no less as an orientalist than as a classical archaeologist, and Henri COHEN, whose great "Description historique des monnaies frappées sous l'Empire romain" (2d ed., 8 vols., 1880-92) is an indispensable book to all workers in Roman numismatics.

The establishment of French rule in Algeria (1830) and in Tunis (1881) threw open to French archaeologists two most interesting districts, which they have explored with great success. A new Pompeii has been laid bare at Timgad. Many of the important Roman sites have been cleared of débris, museums have been established, and knowledge of Roman Africa has been greatly increased, under the leadership of GSELL, TOUTAIN, GAUCKLER, SALADIN, and CAGNAT.

Meanwhile the investigation of the monuments of France itself has been eagerly pursued. Local antiquarian societies have conducted excavations in many places and built up local museums, devoted at first to Gallic and Gallo-Roman antiquities, but later, with the growth of interest in prehistoric monuments, to relics of earlier times as well. In the development of the science of "prehistory," a leading place belongs to Gabriel DE MORTILLET, whose well-known "Préhistorique" (first published in 1883; 3d ed., 1900) was one of the first attempts at a comprehensive treatment of the ages of stone, bronze, and iron. The French government set a brilliant example to all nations in organizing an official

census of all French monuments more systematic and complete than any attempted elsewhere. The Commission des Monuments Historiques has largely directed it, as well as the restorations, and has issued volumes of folio plates since 1855. The Roman period in Algeria and Tunisia has been illustrated by splendid publications, of which the monograph on Timgad is the most spectacular. In France itself ESPÉRANDIEU has given a corpus of all the Roman sculptures, and BLANCHET had described the Gallo-Roman cities. LE BLANT has collected all the early Christian sarcophagi, second in importance only to those of Italy. To VERNEILH is due the first collective study of Byzantine architecture. For the Romanesque period, just preceding the Gothic, the field was covered in the South by REVOIL and in the North by RUPRICH-ROBERT. The scientific basis for the understanding of Gothic art, not only in France, where it originated, but everywhere, was laid by QUICHERAT, and expanded by his brilliant successors, DE LASTEYRIE ("Origines de l'Architecture gothique" and many other works), and ENLART, whose comprehensive "Manuel d'Archéologie française" (1902-16), a full history of French art, is the authoritative statement of the modern school.

Almost contemporary with QUICHERAT, and far more popular, was VIOLLET-LE-DUC, whose studies in the mediaeval architecture and art of France were published in a great series of beautifully written volumes, and who had charge of the restoration of many of the greatest national monuments; the most familiar of his books is his "Dictionnaire raisonné de l'Architecture française du xi^e au xvi^e siècle" (10 vols., 1867-73). Another original teacher was COURAJOD, whose courses at the École du Louvre were revolutionary. The most brilliant illustrator of the art of the Renaissance in France has been PALUSTRE.



EUGÈNE EMMANUEL VIOLLET-LE-DUC (1814-1879)

ARCHAEOLOGY

In the general post-classic field, several French scholars have done invaluable work. DE VOGÜÉ revealed a new branch of early Christian architecture in the ruined cities of Syria ("La Syrie centrale"); in Byzantine art may be noted the work of SCHLUMBERGER (with his trilogy of "Nicéphore Phocas," "L'Épopée byzantine," "Basile II," his numismatic and other studies) and of DIEHL ("L'Art byzantin dans l'Italie meridionale," "Justinien," "Ravenne," etc.). DARTEIN was the first to make known the architecture of Lombardy, and BERTEAUX has done much for South Italian art in the Middle Ages. MÜNTZ is invaluable in correlating the art of the Italian Renaissance with its life and its politics. In the special field of the scientific history of Architecture, the greatest modern authority is CHOISY, whose "Histoire de l'Architecture" (1899) is completed by large special histories: "L'Art de bâtir chez les Romains," "L'Art de bâtir chez les Byzantins," and "L'Art de bâtir chez les Égyptiens."

Aside from the great Annual Congress, which meets each year in a different section of France, the two main forums for archaeology are the meetings of the Académie des Inscriptions et Belles Lettres of the French Institute, and the Société Nationale des Antiquaires de France, both of which publish their Comptes-rendus and the latter its Mémoires.

Instruction at the Universities. As in most other matters, so in facilities for the study of archaeology, Paris is the center of France. In Paris, naturally, are found the richest museums and libraries, and to Paris, ultimately, most of the scholars who distinguish themselves are drawn. A mere enumeration of the men who are engaged in teaching in the higher institutions of the capital is impressive.

Among the members of the Faculty of the *University of Paris* are: Maxime COLLIGNON, professor of Archaeology, a recognized authority on the history of Greek art. His "*Histoire de la Sculpture grecque*" (2 vols., 1892, 1897) is undoubtedly the best history of Greek sculpture that has yet been written. His other writings include, besides numerous articles and pamphlets, "*Pergame*" (1900), a semi-popular account of the earlier excavations at Pergamon, written in collaboration with the architect Pontremoli; "*Le Parthénon*" (1910-12), a magnificently illustrated volume on the finest of the Greek temples; "*Les statues funéraires dans l'art grec*" (1911). He lectures regularly on some aspect of Greek art, and offers advanced instruction for advanced students. Charles DIEHL, professor of Byzantine History, one of the most learned of modern Byzantinists. His best known works are his "*Études byzantines*" (1905); "*Figures byzantines*" (2 vols., 1906, 1908); and "*Manuel d'Art byzantin*" (1910). His lectures deal with different phases of Byzantine history, always with considerable emphasis on the evidence of the monuments. Maurice HOLLEAUX, Chargé de cours in Greek Literature and Epigraphy, was Director of the French School in Athens from 1904 to 1912. With his predecessor (and successor) Théophile HOMOLLE, whose long work in Greece has brought great honor to French scholarship, he is engaged in editing the official publication of the excavations at Delos, "*L'Exploration archéologique de Délos*" (begun in 1909). His lectures and conferences usually have to do with Greek history, with special consideration of the evidence of epigraphy. Émile MÂLE, professor of the History of Mediaeval Art, a writer of distinction in his special field. Among his works are "*L'Art religieux de la fin du moyen âge en France*" (1908), and "*L'Art religieux du xiii^e siècle en France*"

(3d ed., 1910). His courses deal with different aspects of the art of the Middle Ages.

From the faculty of the *Collège de France*, the list of names is equally impressive: Ernest BABELON, professor of Ancient and Mediaeval Numismatics, is Curator of the Department of Medals and Antiquities in the Bibliothèque Nationale, and is a recognized authority in his particular field. Among his more important writings are "Description historique et chronologique des monnaies de la République romaine" (2 vols., 1885, 1886); "Les origines de la Monnaie" (1897); "Traité des Monnaies grecques et romaines" (5 vols., 1901-10). His courses deal with different phases of the development of ancient coinage. René CAGNAT, professor of Roman Epigraphy and Archaeology, a scholar whose name is closely associated with the exploration of Roman Africa. Among his best known works are "Cours d'Épigraphie latine" (3d ed. 1898-1904); "L'Armée romaine d'Afrique et l'Occupation militaire de l'Afrique sous les empereurs" (2 vols., 1913); and many articles and books having to do with Roman Africa. His courses usually deal with Roman monuments and the interpretation of Latin inscriptions. Charles CLERMONT-GANNEAU, professor of Semitic Epigraphy and Archaeology, a scholar deeply versed in the history and the monuments of Western Asia, author of "Archaeological Researches in Palestine during the years 1873-1874" (2 vols., 1896, 1899); "Mission en Palestine et en Phénicie entreprise en 1881" (1882); "Recueil d'archéologie orientale" (8 vols., 1888-1907). He offers every year a course in recently discovered Semitic monuments. Paul FOUCART, professor of Greek Epigraphy and Archaeology, author of "Les mystères d'Eleusis" (1914). His courses commonly deal with Greek inscriptions. Stéphane GSELL, professor of North African History, who has

conducted excavations in Italy as well as in his chosen province. His works include "Les Monuments antiques de l'Algérie" (2 vols., 1901); "Atlas archéologique de l'Algérie" (1911); "Histoire ancienne de l'Afrique du Nord" (vol. 1, 1913; to be complete in six volumes). His courses in recent years have been devoted to Carthage and the Punic wars. The professorship of Egyptology was long held by MASPERO, by whose recent death the Faculty has lost one of its most distinguished members. His work in Paris will no doubt be ably continued by his successor, when appointed.

In the *École des Hautes Études*, Section des Sciences historiques et philologiques, several courses of interest to students of archaeology are offered. Among the Directeurs d'Études in the section are: Bernard HAUSSOULLIER, for Greek Epigraphy and Archaeology, well known as one of the investigators of the temple at Didyma (cf. "Didymes: Fouilles de 1895 et de 1896," in collaboration with E. Pontremoli, 1904), and as one of the authors of the "Recueil des inscriptions juridiques grecques" (2 vols., 1891-1904). His courses are devoted to the study of Greek history and legal antiquities, with reference especially to the evidence of inscriptions and the papyri. Antoine HÉRON DE VILLEFOSSE, for Latin Epigraphy and Roman Archaeology, Curator of Greek and Roman Antiquities in the Louvre, author of a "Rapport sur une mission archéologique en Algérie" (1875), "Le trésor de Bosco Reale" (1899), and numerous articles. He offers one course in inscriptions relating to the officials of the "tres Galliae." In this school, also, CLERMONT-GANNEAU offers a course in the antiquities of Palestine, Phoenicia, and Syria, and another in Jewish archaeology; some work in Egyptology is given under the direction of Paul GUYESSE and Alexandre MORET; and studies in Assyrian Philology and Archaeology are in charge

of the learned Victor SCHELL, though his formal courses in recent years have been devoted to the interpretation of texts and to palaeography rather than to archaeology.

The *École du Louvre*, founded in 1882, offers an interesting three-year program of courses, intended primarily to train directors and curators of museums, but open to auditors, as well as to regularly enrolled students. The subjects covered include the archaeology of France, Oriental archaeology and ancient ceramics, Egyptian archaeology, Greek and Roman archaeology, Semitic antiquities, the history of painting, the history of mediaeval, Renaissance, and modern sculpture, the history of French art in the 17th and 18th centuries, and the history of industrial art in France. The work in Greek and Roman archaeology is under the direction of HÉRON DE VILLEFOSSE, who has already been mentioned. The professors for the other subjects are officials of the Louvre and other museums, not members of other faculties. Among them are: Georges BÉNÉDITE, Curator of Egyptian Antiquities in the Louvre, author of several works in his special field, including two of the scholarly catalogues of the Cairo Museum. Léonce BÉNÉDITE, Curator of the Musée National du Luxembourg, a prolific writer on modern art, one of the founders of the "Bulletin des Musées" and "L'Album des Peintres lithographes." Paul LEPRIEUR, Curator of the Department of Paintings in the Louvre. André MICHEL, Curator of Mediaeval, Renaissance, and Modern Sculpture in the Louvre, best known as editor of the comprehensive "Histoire de l'Art depuis les premiers temps chrétiens jusqu'à nos jours" (begun in 1905, and still in course of publication). Gaston MIGEON, Curator of the Department of the Minor Arts of the Middle Ages, the Renaissance, and Modern Times in the Louvre, an authority on the art of the East as well as that of the West. Pierre de NOLHAC,

Curator of the Musée National de Versailles, editor of the "Bibliothèque littéraire de la Renaissance." He has written numerous works on Versailles and the famous persons associated with it, "Pétrarque et l'humanisme," (2d ed., 2 vols., 1907) and other works relating to the Renaissance. Edmond POTTIER, Curator of Oriental Antiquities and Ancient Ceramics in the Louvre, a critic who makes even catalogues interesting; known to classical scholars through many attractive books and articles on ancient ceramics and terra-cottas, and also as the responsible editor of all the later parts of the great Daremberg and Saglio "Dictionnaire des Antiquités grecques et romaines." Salomon REINACH, Curator of the Musée des Antiquités nationales at St.-Germain-en-Laye, who is, perhaps, the best known of all the French archaeologists, a man of vast erudition and wide interests. He has placed archaeologists of all countries under lasting obligations to him through the convenient books of reference which he has edited, the "Répertoire de la statuaire grecque et romaine" (4 vols., 1897-1910); "Répertoire des vases peints" (2 vols., 1899, 1900); "Répertoire des peintures du moyen âge et de la Renaissance" (3 vols., 1905-10); "Répertoire des reliefs grecs et romains" (3 vols., 1909-12). The breadth of his interests is suggested by this list, and even more by the titles of some of his other books: "Manuel de Philologie classique" (2d ed., 1904); "Cultes, mythes, et religions" (4 vols., 1905-12); "Orphéus; Histoire générale des Religions" (5th ed., 1905). His "Apollo," a brief but scholarly attempt to treat the history of art from palaeolithic times to the present day, has been several times re-issued and translated into other languages. He has been for many years one of the editors of the important "Revue archéologique," associated formerly with G. PERROT, now with E. POTTIER.

The *École Nationale des Beaux Arts*, where so many of our foremost American architects and artists have been taught, has for many years been a proof of the close union that might exist in so many other spheres. Its teaching is historical as well as technical, and it has valuable educational material in casts as well as in original works and in reconstructions of ancient monuments. Its librarian for many years, Eugène MÜNTZ, was one of the earliest, most inspiring and fruitful historians of Renaissance art; his masterpiece is the "Histoire de l'Art pendant la Renaissance" (3 vols., 1889-1891).

Finally, in the *École Nationale des Chartes*, intended primarily to train archivists and librarians, a course in the Archaeology of the Middle Ages is given by Eugène LEFÈVRE-PONTALIS, joint editor with Robert de LASTEYRIE of the earlier volumes of the "Bibliographie des travaux historiques et archéologiques" (1885 on), of whose works "L'Architecture religieuse dans l'ancien diocèse de Soissons au xi^e et au xii^e siècles" (2 vols., 1894-96) is perhaps the best known.

Other Universities. Of opportunities for the study of archaeology outside of Paris it is impossible to give more than a brief account. Most of the fifteen smaller universities make some provision for archaeology and related subjects, sometimes with reference to special conditions; so, in the University of Algiers, instruction is given in the antiquities and geography of Africa and in Mohammedan civilization and the history of the Arabs. Work in "archaeology" is formally provided for at Aix; in "archaeology and the history of art," at Caen, Dijon, Grenoble, Lyon, and Toulouse. In several universities, the professors of the classics offer courses in Greek and Roman antiquities. The American student will occasionally find himself attracted to a particular place by the special attainments of one of

its professors, but in such a brief account as this it is impossible to enter into details.

Museums. In special facilities for graduate work, Paris again is "facile princeps" among the cities of France. Of its more than forty museums, over twenty contain collections which are of interest to the student of archaeology and the history of art. First among them stands the great Musée du Louvre, with its wealth of monuments of sculpture, painting, and the minor arts from many regions and periods. Especially important are the collections of Greek and Roman sculpture; Egyptian, Babylonian, and Assyrian antiquities (the stele of the Hammurapi Code is here); Greek vases; and Renaissance and modern paintings and sculptures. The Musée des Antiquités nationales at St.-Germain-en-Laye contains the largest collection in the world of antiquities of France, covering the prehistoric, Gallic, Gallo-Roman, and French periods to the Carolingian epoch. In the Trocadéro are the Musée de Sculpture comparée, containing casts of important monuments of many different periods; the Musée d'Ethnographie and the Musée Indo-Chinois, the character of which is sufficiently indicated by the names. The Musée de la Bibliothèque Nationale contains not only manuscripts, early printed books, and prints, but in the Cabinet des Médailles it possesses important collections of vases, gems, coins and medals. The Musée de Cluny is devoted to the art of the Middle Ages and the Renaissance; the Musée Guimet to that of the Far East; and there are many other special museums and private collections of importance. Moreover, Paris is one of the great centers of the trade in antiquities, and the student will constantly find opportunities to acquire a knowledge of prices and methods of buying and selling objects of art.

With several of the smaller universities, museums of original materials and reproductions are connected. In these museums, many objects of archaeological interest, dating from the Old Kingdom in Egypt to modern times, are to be found. Special mention may be made of the collections at Bordeaux (Greek and Graeco-Roman sculpture and vases and monuments of early Iberic art); Lille (casts, photographs, and some original monuments); Lyon (large collection of casts and photographs from Egyptian, Greek, and Graeco-Roman monuments); Montpellier (casts from ancient sculpture, photographs, and prints); and Nancy (casts and some original monuments). Interesting collections of local antiquities, often rich in Roman and Gallic sculpture, are at Nîmes, Arles, Aix, Langres, Autun, Vienne, and Narbonne.

Libraries. Among the libraries of Paris, the great Bibliothèque Nationale, with its 3,000,000 volumes, is especially rich in works on archaeology; and its 110,000 manuscripts and some 1,000,000 prints offer many opportunities for research work along documentary lines. There are, besides, several special libraries, where books not in the Bibliothèque Nationale can often be found. Among these the most important are the Bibliothèque d'Art et d'Archéologie (some 100,000 volumes); the Bibliothèque du Musée de Sculpture comparée (about 2,000 volumes and over 60,000 drawings, prints, and photographs); the Bibliothèque de l'Association pour l'Encouragement des Études grecques (about 5,000 volumes); the Bibliothèque de l'École des Beaux Arts (rich in drawings, photographs, and illustrated works); and the Bibliothèque de la Société des Antiquaires de France (about 4,000 volumes).

Periodicals. The "Revue Archéologique" covers the entire field, with admirable summaries of investigations

and discoveries everywhere. The "Gazette des Beaux Arts" occupies a similar position in the more restricted field of art history. The "Bulletin Monumental" does the same, but mainly for France. The most sumptuous medium for the publication of important works of historic art is supplied by the folios of the "Monuments Piot," an endowed periodical of the Académie des Inscriptions, whose only rival is the "Denkmäler" of the German Institute. Prehistoric studies are best represented in "L'Anthropologie" and the "Revue de l'École d'Anthropologie." The "Annales du Musée Guimet" make a specialty of the Far East; so does the "Bulletin de l'École française de l'Extrême-Orient." Other Eastern spheres are taken care of in the "Revue Égyptologique," the "Revue d'Assyriologie," the "Revue d'Archéologie Orientale," the "Revue Sémitique" and the "Mémoires" of the Mission au Caire.

Special subjects have their organs also, as the "Revue Épigraphique" and "L'Année Épigraphique"; the "Revue de Numismatique," and the "Gazette Numismatique française." Several reviews not strictly archaeological have a strong archaeological section, such as the "Revue de l'Histoire des Religions." Each of the Archaeological Schools has its special review: that at Athens, the "Bulletin de Correspondance Hellénique"; that at Rome, the "Mélanges d'Archéologie et d'Histoire." Both are devoted largely to Greek and Roman studies, but give a fair share to the Christian period. A very special review is the "Revue de l'Art Chrétien." Devoted to France almost exclusively is "L'Ami des Monuments."

ASTRONOMY

ASTRONOMY¹

In all branches of Astronomy—in Geodesy, Observational Astronomy, Astrophysics, and Celestial Mechanics—France has made noteworthy contributions. In the first three named, she has kept abreast of all progress and has often led the way; and in Celestial Mechanics, or Mathematical Astronomy, she is well-nigh supreme.

Her work in Mathematics, in developing methods of analysis and lines of attack; and in Physics, in establishing standards of wave-lengths of light, in fact in the whole field of radiation; is reflected in the progress of Astronomy. It sometimes happens, moreover, that noteworthy advances follow achievements in fields quite apart from that of the direct research; and as one such instance, GUILLAUME's discovery of invar, in relation to the errors, due to temperature effects, which creep into all instrumental observations, must be regarded as one of the indirect influences promoting advances of prime importance.

Celestial Mechanics. Since the publication of Newton's *Principia* in 1686, the contributions of all other nations combined would scarcely equal in this field the contributions of France alone.

It was CLAIRAUT (1713-1783) who first published the differential equations of motion for the problem of three bodies, and their ten integrals. The formidable

¹[Drafting Committee: PHILIP FOX, Northwestern University; G. E. HALE, Carnegie Institution; F. R. MOULTON and W. D. MACMILLAN, University of Chicago; H. N. RUSSELL, Princeton University.—Ed.]

mathematical difficulties of this problem and the importance of its solution for Astronomy, particularly for an understanding of the motion of the moon, challenged the attention and abilities of the mathematicians of the entire world. No great mathematician, until very recent times, has escaped the charm of this problem. From France, however, has come the greater part of our present knowledge of a subject which has tested to the utmost the strength of the human intellect since the time of the immortal NEWTON. The first two analytical theories of the motion of the moon were presented on the same day to the Paris Academy by CLAIRAUT and by D'ALEMBERT (1717-1783), and these were the first efforts at an analytical solution of the problem of three bodies. D'ALEMBERT introduced even the rotation of the earth into his theories, and thus developed the theory of the precession of the equinoxes. The first rigorous solution of the problem of three bodies, due to LAGRANGE (1736-1813), is contained in a paper of great elegance published in 1772. Many other theorems of great importance were contained in his later papers. In his epochal "Mécanique analytique" he made it his boast that he had freed the subject of mechanics from geometrical intuition, and brought all of its problems into the domain of pure analysis. In striking contrast to the method of Lagrange was that of POISSON (1781-1840), who strove to develop the geometrical intuitions to the utmost in the solutions of mechanical problems.

LAPLACE (1749-1827), however, even more than Lagrange, devoted himself to the mechanics of the celestial bodies. The theory of the motion of the moon, the mutual perturbations of the planets and their satellites, and the determination of the orbits of comets, received masterly treatment in his hands; and no problem in this field escaped his critical attention. His

"*Traité de la Mécanique céleste*," in five large volumes, will always be one of the great classics in the domain of mathematical astronomy. His Nebular Hypothesis of the origin of the solar system exercised a profound influence upon the fundamental conceptions of almost every science during the entire nineteenth century. It was the first successful effort in the modern doctrine of evolution.

The theory of the motion of the moon was a highly favored subject during the first half of the last century. The theory developed by Laplace was carried to a high degree of perfection by DAMOISEAU (1768-1846). A second theory was worked out extensively by DE PONTÉ-COULANT (1795-1874); a third, and by far the most perfect theory was developed by DELAUNAY (1816-1872). The theory of Delaunay, which was the result of twenty years of constant labor, was published between 1860 and 1867.

A dramatic event about the middle of the nineteenth century immortalized the names of LE VERRIER (1811-1877) of France and ADAMS of England. Their mathematical analysis led these two men independently to point to a certain position in the sky and say, "In that direction lies a planet not yet seen by mortal eyes." This prediction, verified promptly by the telescope, has been justly regarded as one of the great triumphs of man's powers of analysis. It was also under Le Verrier's directions that the theory of the perturbations of the planets was carried to its high state of perfection.

In the last decade of the last century TISSERAND (1845-) of Paris published his "*Traité de la Mécanique céleste*," which is today the standard work of reference in its field. It is complete in its details and embodies all the essential developments in the field of celestial mechanics up to the time of Poincaré.

The last name which will be mentioned in this field, and perhaps the greatest, is that of Henri POINCARÉ (1854-1912). His remarkable work "Méthodes nouvelles de la Mécanique céleste," furnished a great wealth of new ideas, which were developed with the very highest mathematical skill. Periodic orbits of various types, asymptotically periodic orbits, and integral invariants, were the fundamental conceptions which were examined with all of the resources of modern mathematics and with all of the rigor which modern mathematics demands. It is a modest statement to say that with POINCARÉ begins a new epoch in celestial mechanics. In addition to his contributions to the theory of the motions of the celestial bodies should be mentioned his contributions to the theory of their figures. It was CLAIRAUT who first showed that an oblate spheroid is a figure of equilibrium of a slowly rotating fluid mass. POINCARÉ showed that besides the ellipsoidal figures already known there exists an infinity of other forms corresponding to higher rates of rotation. His theorems relating to stable and unstable figures of equilibrium are of great importance. These investigations find their application not merely in the figures of such planets as Jupiter and Saturn but also in the question of the origin of binary and multiple stars.

With such a wealth of noble tradition in the field of Celestial Mechanics, it is quite safe to assume that the Universities of France, and especially of Paris, will always be a source of inspiration to students who may be interested in this field.

Geodesy. The monumental works of the French in the past are being paralleled by contemporary contributions. This is well illustrated in the geodetic work in the recent achievement of the expedition under BOURGEOIS, which has remeasured with the highest precision



PIERRE SIMON DE LAPLACE (1749-1827)

ASTRONOMY

the "arc of Peru," —that arc which when measured by French astronomers in an earlier century afforded the first practical proof of the ellipticity of the earth. The same scale of achievement is seen in the work of precise leveling conducted by LALLEMAND and his associates, repeating and extending the earlier work of BOURDALOUE. The French have been very active in developing the application of wireless telegraphy in longitude determinations. This is illustrated by their observations between Paris and Poulkovo, Paris and points in Algeria, and culminating in the Paris-Washington campaign of 1913.

Observational Astronomy. France has equipped many observatories where work is being conducted, following carefully prepared plans, well organized, and actively executed. The long series of publications from these institutions—Paris, Bordeaux, Nice, Abbadie, Toulouse, Meudon, Besançon, Marseille, Lyon, Algiers—bear ample testimony of their fruitfulness. In the field of observations of position, the most notable among many excellent star catalogues is that of the Paris Observatory, in eight volumes. BOSSERT's catalogue of proper motions is important in any work dealing with stellar motion. Double stars have been actively observed at Toulouse and by JONCKHEERE, who made many and important discoveries in this field, at the Observatoire d'Hem and later at Lille. In the discovery of celestial bodies the French observers present about sixty comets, about 180 asteroids, and many nebulae. Here the names CHARLOIS, CHACORNAC, COGGIA, PERROTIN, the brothers HENRY, STEPHAN, BORRELLY, TEMPLE, GIACOBINI, QUÉNISSET, and others, are familiar. In photometric work the numerous and careful observations of LUIZET are of especial value.

Practical Astronomy. Among astronomical instruments of French invention, mention may be made of the equatorial coudé of LOEWY and PUISEUX; the independent design of the spectroheliograph by DESLANDRES (at practically the same time as by the American HALE); the "spectroenregistreur des vitesses" of DESLANDRES; and the recent use of the "astrolabe à prisme" in the determination of latitude and time.

In spectroscopy, the French contributions to the development of the science have been very great. In solar physics, they include the discovery of the spectroscopic visibility of the solar prominences, independently of solar eclipses, by JANSSEN in 1868 (also made independently by LOCKYER in England); the recent researches of DESLANDRES (whose spectro-heliograms are in many respects of unrivalled excellence) upon the upper layers of the solar atmosphere and the relative motion of their parts. In stellar spectroscopy, they include the FIZEAU extension of the DOPPLER principle, which made possible the whole movement for the spectroscopic determination of radial velocity; the discovery of those remarkable bodies which are still known, in honor of their discoverers, as the WOLF-RAYET stars; the spectroscopic work of HAMY; and the work of FABRY and his collaborators on the Orion nebula.

In astronomical photography, France occupies a leading position. This is perhaps natural, because the development of photography is in so large a part due to the French. The Atlas of the Moon, by LOEWY and PUISEUX, is the standard in its field; the solar photographs of JANSSEN are in a class by themselves; but above all other work in importance towers the "Carte Photographique du Ciel," which, as its name implies, owes its inception largely to French influence. The headquarters of the international committee which

supervises this great enterprise has always been in Paris, and zones have been undertaken and in large measure completed by the Observatories of Paris, Bordeaux, Toulouse, and Algiers. This committee has also organized other important investigations, notably the campaign of observations on the asteroid Eros in 1900-1901, which has resulted in the most precise determination of the distance of the Sun that has yet been made.

The influence of France has been directed toward friendly coöperation on the large problems of astronomy, and thus Paris naturally has been the seat of many important astronomical Conferences. At the Conference on fundamental star positions, in 1896, a uniform system of values of the fundamental constants of astronomy was adopted for use in all astronomical ephemerides. At the "Conférence Internationale des Éphémérides astronomiques," in 1911, a uniform system of presentation of astronomical data was adopted by all the national Ephemerides, and arrangements were perfected for exchange of work involved in their computation and publication; these have been among the very few fragments of international coöperation to survive the shock of the Great War.

Instruction. *University of Paris.* Here the principal courses of interest to the advanced student of Astronomy are the following: By ANDOYER, a distinguished student of all matters which bear upon elegance and accuracy of computation: 1914-15, Theory of eclipses; 1915-16, Elementary solutions of the fundamental problems of Celestial mechanics. By APPELL, widely known as a mathematician: 1914-15, 1915-16, Celestial Mechanics, Works of Poincaré. By PUISEUX, known for his studies on the Moon and on other astrophysical questions: 1914-15, Stars and Nebulae; 1915-16, The Sun, solar spectrum, eclipses.

Other Universities. Courses in Astronomy are given in almost all the provincial universities of France. The opportunities of most interest to the graduate student are likely to be found at

MARSEILLE, where the observatory is open to foreign men of science for research, and practical instruction for students is arranged, under the direction of FABRY, the distinguished spectroscopist, known for his work on the precise measurement of wave-lengths.

LYON, where the observatory at St.-Genis-Laval, though principally devoted to research, admits students for practical instruction in astronomy, under the care of LUIZET, one of the best-known students of variable stars.

TOULOUSE, where the observatory, which has taken an important share in the preparation of the great international photographic "Carte du Ciel," admits foreign investigators, and gives practical instruction to students in the University.

The observatories of ALGIERS and BORDEAUX, which are also doing work of the first quality, are likewise connected with the Universities situated in these cities.

**BOTANY *and*
AGRICULTURE**

BOTANY¹

French botanists have been conspicuous chiefly in the development of Taxonomy and Palaeobotany.

The first great name in the history of classification is that of **TOURNEFORT** (1656-1708), Professor at the Royal Gardens in Paris. He was the founder of genera; that is, he was the first who organized groups of species into the next higher category of classification. Later **Antoine DE JUSSIEU**, Director of the Museum of Natural History in Paris, published the first natural system of classification in his "*Genera Plantarum*" (1789), in which he first established the category of classification known as families, which are natural groups of genera. Then **Auguste DE CANDOLLE**, first of Paris and later of Geneva, first grouped families into orders, the next higher category of classification, and established a sequence of families long used in all manuals of botany.

As a consequence of this early work in classification, the Herbarium of the Jardin des Plantes contains more of the early "types" of North American plants than any other European collection, and must always be consulted in any monographic work.

One of the outstanding names in the history of French botany is that of **LAMARCK** (1744-1829), who for twenty-five years was Director of the Royal Gardens, to which he gave the name "*Jardin des Plantes*," which has been used ever since. He was the author of the first "*Flora of France*," the pioneer manual of French botany. It was

¹ [Drafting Committee: J. M. COULTER, University of Chicago.—ED.]

during his activities as a botanist that an unusual number of North American plants came to Paris for identification, and that the herbarium under his direction became rich in American "types." Later Lamarck became a zoölogist, and proposed the first great explanation of organic evolution, which is now usually referred to as "Lamarckism."

The fossil flora of France is one of the best preserved in the world, and this has been taken advantage of in the strong development of Palaeobotany by such leaders as BRONGNIART, who published the first extensive account of fossil plants; followed by DE SAPORTA, RENAULT, ZEILLER, BERTRAND, GRAND-EURY, and LIGNIER. This very unusual group of palaeobotanists has contributed more to our knowledge of ancient vegetation than any group of palaeobotanists in the world.

The more modern fields of botany, as morphology, plant pathology, anatomy, ecology, and plant breeding, have received important contributions from such investigators as VAN TIEGHEM, who first put the study of vascular anatomy upon its modern scientific basis; BONNIER, who was a pioneer in the study of the effect of environment on plants, especially the changes induced in the same plant by alpine and lowland habitats; GUIGNARD, who was a pioneer in the field of modern morphology, especially contributing to our knowledge of the reproduction and embryology of the higher plants, and discovering the phenomenon of double fertilization; and in addition BAILLON, DANGEARD, SAUVAGEAU, COSTANTIN, and PRILLEUX.

Instruction at Paris. The different institutions coming under the general title of the University of Paris offer unusual and varied opportunities to students of botany, especially the Sorbonne, the École supérieure de



JEAN LOUIS LÉON GUIGNARD (1852-)

BOTANY

Pharmacie, and the Muséum d'Histoire Naturelle. The laboratories are well equipped and rich in material, and the investigators in charge are constant contributors to botanical literature. Among the more notable teachers and investigators now available are the following:

At the Sorbonne, BONNIER lectures upon the chemistry of plant nutrition, a fundamental subject in scientific agriculture. MOLLIARD supplements the point of view developed by BONNIER, by means of lectures in the physics of plants. Together these two courses introduce the student to the great modern field of plant physiology. In addition, MATRUCHOT is an authority upon the lower plant groups (algae, fungi, and bacteria), and includes in his work with these groups a course in plant pathology.

At the École supérieure de Pharmacie, a notable figure is that of GUIGNARD, pioneer in modern morphology, whose discoveries and technique in this field are surpassed in no laboratory. His material includes chiefly the higher plants, but associated with him is RADAIS, an authority in cryptogams. The whole range of plant morphology, therefore, is presented by these two investigators.

At the Muséum d'Histoire Naturelle a notable group of three investigators supplement one another, and offer a wide range of opportunity. LECOMTE deals with the phanerogams, while MANGIN is a specialist in cryptogams. Perhaps the unique opportunity, however, is offered by COSTANTIN in his remarkable work on the scientific culture of plants. Recently he has solved the riddle of orchid culture, discovering that an associated parasite is necessary for seed germination. This indicates the fundamental nature of his culture studies.

Opportunities Outside of Paris. There are at least three botanical institutions outside Paris that deserve

special mention because of the unusual opportunities they offer.

The Laboratoire de Biologie végétale at Fontainebleau is established in that famous forest, and furnishes a unique opportunity for what may be called field studies, in contrast with laboratory studies. The investigation of the activities of plants in the open is a necessary supplement to a knowledge of their structures as revealed in the laboratory. No student of botany in France should fail to come in contact with the Fontainebleau establishment.

At Montpellier, the Institut de Botanique in connection with the university is one of the famous establishments of the world. Its well equipped laboratories and library and its extensive botanic garden have long been used in connection with important research work. The distinguishing feature of the institute is its important work in agriculture, horticulture, and forestry. In addition to the equipment referred to, there is a mountain laboratory (Laboratoire du mont Aigoual), with an elevation of 1300 meters, which is organized for the study of mountain plants and alpine conditions.

At Nancy, the Institut Agricole is a famous establishment, providing instruction in the profession of scientific agriculture in Europe or in the French colonies. Its five sections indicate the scope of the work and the opportunity: agriculture, dairy-farming, economics, colonial studies, and forestry.

AGRICULTURE¹

The recent history of agriculture in France has been that of a general movement, at first opposed, but finally remarkably successful. No training in agriculture is complete without including some knowledge of the organization and methods developed in France.

The first movement was in the direction of agricultural education. In 1848 the government adopted a plan which provided agricultural teaching of three grades: (1) elementary practical instruction, (2) secondary practical and theoretical instruction, and (3) advanced training in the Institut National Agronomique. From the beginning good results were obtained, but opposition led to the suppression of the Institut, and to a reduction in the number of the other schools. Later, through the efforts of Eugène TISSERAND, a successful organization of agricultural education was established, and the Institut National Agronomique was re-established with a competent staff, and since 1876 has been demonstrating its great usefulness.

Secondary instruction is given in the three great central schools of Grignon, Montpellier, and Rennes; horticulture is cared for by the École Nationale d'Horticulture, founded at Versailles in 1874; while the special needs of various regions have been met by secondary schools. Between the farm schools, intended to train skilled laborers in the practical side alone, and the secondary schools, there seemed to be too wide an inter-

¹ [Drafting Committee: J. M. COULTER, University of Chicago.—ED.]

val, and to meet this deficiency a law was passed in 1875 organizing experimental agricultural schools to assist in the training of farmers' sons and daughters. Traveling schools also went from district to district, giving similar instruction in short courses.

In 1879 a law was passed providing for professors and administrators of agriculture to visit the various districts, and from that time they have played an important rôle in organizing short courses, conferences, agricultural societies, mutual insurance societies, farmers' mutual loan companies, and organizations promoting coöperation in buying, selling and producing. Also demonstration fields and experiment stations, together with a variety of experimental research laboratories, were established in various parts of the country.

The progress of agricultural education has been aided largely through the efforts of agricultural societies. The Société Nationale d'Agriculture, founded in 1761, is foremost among these societies, and is now very properly called the Académie d'Agriculture. Its annals for a century and a half have contained the names of eminent scientists, who have contributed to the development of agriculture through chemistry, physics, botany, and zoölogy. It is still of great assistance in bringing the results of science to the solution of soil problems.

Several other large societies are grouped about the Académie d'Agriculture, ranging from La Société des Agriculteurs de France, the oldest of the societies, with 9000 members scattered throughout the country, to the recently founded Société Nationale d'Encouragement à l'Agriculture. La Société Nationale d'Horticulture de France for 25 years has been prominent in caring for the horticultural interests, while vine growers are represented by La Société des Viticulteurs de France. About these large organizations are grouped very numerous

smaller societies, all contributing to the cultivation of interest in agriculture by means of bulletins, meetings, and fairs.

A summary of the advancement in agricultural education in France during the past 40 years is as follows: establishment of education in scientific agriculture through the Institut National Agronomique; providing for secondary agricultural education in national schools; organization of primary agricultural education by establishing schools of practical agriculture; creation of a complete staff of professors to teach the best and most useful methods in rural communities; inauguration of practical agricultural instruction for girls and popular instruction for adults through traveling schools of short courses, held during the winter; dissemination and popularization of agricultural knowledge by agricultural societies; supplementing theoretical and practical instruction by demonstrations at various fairs, permitting farmers to know and appreciate the annual advance of agricultural science.

Another notable feature of French agriculture is agricultural coöperation. While only a minority of the farmers have come in direct contact with the instruction provided, economic stress has tended to bring all the farmers together. In 1884 a law was passed for the organization of professional syndicates, and by an amendment it was extended to include the farmers. The purpose of the agricultural syndicate was to study and defend the economic and other interests of the farmers. One of the first undertakings was the purchase on a large scale of fertilizers, thus giving the small farmer the advantages of reduced prices, guaranteed quality, and low freight charges upon this important commodity. The scope of these syndicates was extended later to include large purchases of selected seed,

well bred farm animals, agricultural machinery, and insecticides. This not only resulted in economy from wholesale buying and shipping, but had a beneficial educational effect in the introduction of improved seed, better cattle, tools, and methods. Later, attention was directed to conditions of marketing, and many syndicates collected and graded the crops of their members, marketing them to much greater advantage and gaining the further advantage of low freight charges upon car-load shipments.

The syndicates have proved great social factors in bringing together, upon an entirely equal footing, proprietor, tenant, and laborer, under the motto "All for each, and each for all." In 1887 there were 214 syndicates; in 1805 the number was 1188, including 400,000 adherents; and at the present time there are more than 6000 organizations, including nearly 1,000,000 farmers.

Another feature of agriculture in France is the farm loan system, which created a system of credit for farmers somewhat different from commercial credit. Mutual farm loan companies have been established by members of the farmers' syndicates. These loan companies were made possible by advances from the State, through the Bank of France. In 1910 there existed 98 central companies and 3000 local companies, comprising 152,000 members; and the plan has proved to be extremely successful.

Before 1898 no special encouragement was given to agriculture by mutual insurance societies; then laws were passed authorizing insurance societies to benefit by the law in reference to rural syndicates, and in 1912 there were 13,000 local mutual organizations insuring against loss by death of cattle or by fire. A series of guarantees is provided, extending from the local societies, through central companies, to "The Central Trust of the Syndicate of Farmers of France."

The whole syndicate movement in France has been a happy means of grouping all the vital forces of agriculture into a common and democratic movement. In consequence, the condition of the rural population has been immensely improved, both in spirit and in product.

The standing of agriculture in France was improved in 1881 by the appointment of a Minister of Agriculture. Before that time the interests of agriculture were entrusted successively to the Minister of the Interior, of Commerce, and of Public Works. The Minister of Agriculture has, among his other duties, charge of the supervision of agricultural education, coöperation, and improvements; of horse-breeding and veterinary education; of suppressing frauds in agricultural products. The improvements under the regime of ministers of agriculture have been marked. Among the means adopted for encouraging agriculture may be cited the organization of central and local fairs, awarding prizes for crops, investigations of the suitability of farm machinery, encouragement of the industrial use of denatured alcohol, and the collection and publication of annual statistics of farm products.

The forestry school of Nancy, founded in 1824, became more truly a scientific institution when in 1888 its students were required to present diplomas from the Institut National Agronomique for their matriculation. Other schools for advanced and secondary work in forestry were also established. The Forest Service administered the State forests, and at the same time had charge of projects for the reforestation of mountains and the conservation of woodlands. Since 1880 the State forests have been increased 22 per cent., and each year 7000 hectares are reforested. The rural hydraulic service has charge of drainage and irrigation projects and the flood control of streams. The development and

utilization of the water-power of the wooded mountains through easily transportable electric power has received attention, and as a result many thousands of horsepower are available from the French Alps. Recently efforts have been made to utilize some of this power in promoting rural industries.

The remarkably effective organization of the agricultural interests of France deserves the careful study of all students of agriculture in this country.

CHEMISTRY

CHEMISTRY¹

There was a time, thanks chiefly to the genius of LAVOISIER, when chemistry was in truth a "French science." Now that it has diffused from France over the whole world and become international, the labors of that epoch remain as an inspiration to chemists of every nation. There is hardly a single tendency of the science which is not founded upon the researches of the French.

From the time of LAVOISIER, the development of French chemistry was rapid and broad, because founded upon measurement and established in a very favorable environment. BERTHOLLET, GAY-LUSSAC, and THÉNARD, at the beginning of last century; later CHEVREUL, DUMAS, LAURENT and GERHARDT, WÜRTZ, SAINTE-CLAIRE DEVILLE, and BERTHELOT, together with AMPÈRE and PASTEUR (two great names better known in other fields), contributed a large part of the principles, the theories, and the facts upon which the modern science rests. More recently BERTHELOT (the undisputed head of French chemistry, and perhaps the most versatile of modern chemists), MOISSAN, BECQUEREL, CURIE, and others still alive, have worthily continued the great national tradition.

Dalton's rudimentary atomic theory required the principle of Lavoisier as its necessary foundation. To its development, GAY-LUSSAC contributed the law of volumes and a study of the radical of cyanogen, AMPÈRE

¹ [Drafting Committee: W. D. BANCROFT, Cornell University; F. B. DAINS, University of Kansas; L. J. HENDERSON, Harvard University.—ED.]

an independent formulation of the hypothesis of Avogadro, DUMAS the idea of substitution, LAURENT and GERHARDT the conception of types, PASTEUR the beautiful and subtle theory of molecular asymmetry, LE BEL and GUYE the fundamentals of stereochemistry. To the development of organic chemistry, which served at every later stage as the support of the growing atomic theory, CHEVREUL contributed the explanation of the constitution of the fats; DUMAS, RAOULT, GUYE, WÜRTZ, ST.-GILLES, and BERTHELOT, a great variety of important discoveries. Not less do inorganic chemistry (through the labors of a large number of investigators), crystallography (through the researches of ROMÉ DE L'ISLE and HAÜY), and physical chemistry (through those of BERTHOLLET and GAY-LUSSAC), take their origin in France. Turning to another field, the beginnings of the science of metabolism are to be found in the researches of LAVOISIER and LAPLACE, while the labors of PASTEUR have revolutionized chemical biology and created chemical pathology. The early development of agricultural chemistry is illustrated by the work of BOUSSINGAULT. And lastly the history of chemistry has profited by many important investigations of BERTHELOT and DUHEM.

University instruction and research in France at the present time may be summarized by mentioning the best-known workers:

Instruction at Paris. I. At the *Sorbonne* (faculty of sciences): Mme. CURIE, professor of physics, the co-discoverer (with her husband, who died in 1906) of radium, the discoverer of polonium, and the author of a series of investigations in the important field which her own labors, extending Henri BECQUEREL's discovery of the radio-activity of uranium, have opened to science;



ANTOINE LAURENT LAVOISIER (1743-1794)
CLAUDE LOUIS BERTHOLLET (1748-1822)
(From a painting in the Sorbonne)

CHEMISTRY

Mme. Curie is a Nobel Laureate and (with P. CURIE) the author of a work "Traité de radioactivité" (2 vols., Paris, 1910); LE CHATELIER, professor of chemistry, a physical chemist of great eminence and versatility, author of researches on chemical thermodynamics, on pyrometry, the equilibria of alloys, and the microscopy of alloys; he has published "Recherches expérimentales et théoriques sur les équilibres chimiques," (Paris, 1880), "Introduction à l'étude de la métallurgie," (Paris, 1912), "Leçons sur le carbone, la combustion, les lois chimiques" (Paris, 1908); and "La silice et les silicates"; URBAIN, professor of chemistry, famous especially for his investigations upon the rare earths, their separation and their spectroscopy, author of "Introduction à l'étude de la Spectrochimie," (Paris, 1911); HALLER, professor of organic chemistry, a specialist in the investigation of camphor and its derivatives, of alcohol, and of reactions of reduction, author of "Théorie générale des alcools" (Paris, 1879), and "Les récents progrès de la Chimie organique" (3 vols., Paris, 1904-1908); G. BERTRAND (of the Institut Pasteur), professor of biological chemistry, a student of enzymes, especially the oxydases, and of the sugars; CHABRIÉ, professor of applied chemistry; Jean PERRIN, professor of physical chemistry, who has conducted important investigations on the Brownian movement, the theory of colloids, and the molecular kinetic theory, author of "Rayons cathodiques et rayons de Roentgen" (Paris, 1897), "Traité de Chimie physique, Les principes" (Paris, 1903), and "Les atomes" (Paris, 1913).

II. At the *Collège de France*: MATIGNON, a physical chemist whose researches have been especially in the field of thermochemistry, and of the rare earths; JUNG-FLEISCH, an organic chemist who has made important investigations upon tartaric acid and certain derivatives

of benzene, (with Berthelot) author of "Traité de Chimie organique" (4th ed., 3 vol., Paris, 1907-1908), and "Leçons sur les méthodes générales de synthèse en chimie organique" (Paris, 1864).

III. At the *Muséum d'Histoire Naturelle*: MAQUENNE, whose researches extend over the field of the carbohydrates, author of "Les Sucres et leurs principaux dérivés" (Paris, 1900); and ARNAUD.

IV. At the *École Supérieure de Pharmacie*: BÉHAL, an organic chemist who, among other subjects, has studied unsaturated compounds and creosote, author of "Traité de Chimie organique" (2 vols., Paris, 1909-1911, 3d ed.); GAUTIER, known for various investigations in organic chemistry, in chemical toxicology, and in hygiene, author of "Cours de Chimie organique" (Paris, 1906, 3d ed.), "Ptomaines et leucomaines" (Paris, 1866), and "L'Alimentation et les régimes chez l'homme sain et chez les malades" (Paris, 1904); D. BERTHELOT, author of important researches on the theory of gases, the determination of molecular weights, and photochemistry; MOUREU, a student of the rare gases of the atmosphere, and an eminent organic chemist, author of "Notions fondamentales de Chimie organique" (Paris, 1902); BOURQUELOT, whose researches upon enzymes are well-known, author of "Les Ferments solubles" (Paris, 1896); VILLIERS; GUIMBERT; and LEBEAU.

V. At the *École Municipale de Chimie*, HANRIOT and COPAUX; at the *Faculty of Medicine*, DESGREZ; at the *École Libre des Hautes Études Scientifiques*, HAMONET.

There are also at Paris, chiefly at the *Institut Pasteur*, a number of others, including BERTRAND, ROUX, MESNIL, DELEZENNE, CHAMBERLAND, MARTIN, MAZÉ, MOUTON, J. DUCLAUX, whose investigations fall in the borderland of chemistry, physiology, pathology, and

general biology. Also in Paris, but not connected with the ministry of public instruction, are a considerable number of other chemists of distinction, including LE BEL, G. LEMOINE, SCHLOESING, SCHLOESING FILS, and MÜNTZ.

In 1914-15 the courses in chemistry given in Paris were as follows:

I. *Faculty of Sciences*. General Physics: Mme. CURIE, "Ions in Gases and the Phenomena of Radioactivity." General Chemistry: LE CHATELIER, "The Properties of the Metals and the General Laws of Chemistry." Chemistry: URBAIN, "Thermochemistry and the Energetics of Chemical Reactions." Organic Chemistry: HALLER, "The Aromatic Series." Physical Chemistry: PERRIN, "General Physical Chemistry." Applied Chemistry: CHABRIÉ, "Fuels, Precious Metals and the Manufacture of Alcohol." Biological Chemistry: BERTRAND, "The Chemical Composition of Living Organisms."

In addition to these courses, numerous conferences were held, as follows: OUVARD, "Technology;" GUICHARD, "The Study of Original Memoirs in General Chemistry, and the Metalloids and Metals;" V. AUGER, "Inorganic Chemistry;" BLAISE, "Organic Chemistry, General Principles and Study of the Aliphatic Series;" FERNBACH, "Microbes in the Fermentation Industry, and Alcoholic Fermentation."

II. *Institut de Chimie Appliquée*. In this institute, under the direction of CHABRIÉ, are given certain courses supplementary to those of the faculty of sciences, including elementary qualitative and quantitative analysis by Binet du JASSONNEIX, qualitative organic analysis and organic preparations by FREUNDLER, analysis and preparation of industrial products by MARQUIS, and physical chemistry and electrochemistry by MARIE.

Students, including foreigners, over eighteen years of age are admitted to this school by examination.

III. At the *Faculté de Médecine*, there are courses on chemistry applied to medicine, conducted by DESGREZ and LABBÉ, together with other courses in physiology, medical physics, hygiene, pharmacology, pathology, etc.

IV. At the *École Supérieure de Pharmacie* there are the following courses: VILLIERS, qualitative and quantitative analysis; GAUTIER, inorganic chemistry; GRIMBERT, biological chemistry; BÉHAL, organic chemistry; LEBEAU, toxicology; BOURQUELOT, pharmacy; MOUREU, chemical pharmacy.

V. At the *Institut Pasteur* there is a section of biological chemistry, comprising a laboratory of biological chemistry (affiliated with the faculty of sciences), the service of fermentations, a laboratory of agricultural chemistry, and a laboratory for instruction in biological chemistry. This section of the Institute gives theoretical and practical instruction in the several branches of the subject; to this instruction properly qualified foreigners are admitted.

VI. There are also courses on chemistry and allied subjects at the *Collège de France*, at the *Muséum d'Histoire Naturelle*, and in various other places.

VII. The *École Pratique des Hautes Études* includes a number of chemical laboratories. Qualified students are admitted as members of this school, without regard to age or nationality or formal qualification, into its laboratories, at the pleasure of the laboratory chief. This arrangement makes free the access to nearly all the advanced laboratories of Paris.

Laboratories in the following subjects are associated with this school: Inorganic chemistry at the Sorbonne (Le Chatelier, director); Chemistry, at the *École Normale*

(Lespieau, director); Inorganic Chemistry, at the Collège de France (Matignon, director); Biological Chemistry, at the Institut Pasteur (Roux, director); Organic Chemistry, at the Collège de France (Jungfleisch, director); Organic Chemistry, at the Sorbonne (Haller, director); Pathological Chemistry, at the Collège de France (Goupil, director).

VIII. The *Institute of Hydrology and Climatology* includes the following laboratories, among others: Water Analysis, at the Sorbonne (Urbain, director); Physical Chemistry, at the École Supérieure de Pharmacie (Moureu, director).

IX. There are also chemical laboratories in the various institutes and schools of agriculture, horticulture, veterinary medicine, etc., which abound in the capital and its environs, as well as at the École Municipale de Chimie.

Provincial Universities. Opportunities for study and research in chemistry at the other universities are far less varied than at Paris, and in the different institutions are decidedly unequal. In some instances, as at Nancy, every department of the science is represented, and the student has every necessary opportunity at his disposal. But in certain smaller institutions each faculty has but a single chair of chemistry. The subject is, however, always represented in both the faculty of sciences and the faculty (or "École préparatoire") of medicine; it is also represented in certain "Facultés libres;" and there are, of course, in connection with the schools of medicine, various chairs which are chiefly concerned with one or another aspect of the more fundamental science. In some instances, there are also institutes of chemistry and applied chemistry affiliated with the university faculties. It should be distinctly understood that some of the best chemists in France are to be found in the

provinces. The following list includes most of the principal chemists of the several provincial universities:

Besançon. Faculty of sciences: L. BOUTROUX, professor of chemistry; TISSIER, professor of applied chemistry.

Bordeaux. Faculty of sciences: GAYON, professor of chemistry; VEZES, professor of inorganic chemistry and director of a technical laboratory; VIGOUROUX, known for his researches on alloys; M. DUBOURG, adjunct professor of agricultural chemistry and head of the school of applied chemistry. Faculty of medicine and pharmacy: BLAREZ, professor of chemistry; DENIGÈS, professor of biological chemistry, known for his investigation of a number of interesting reactions.

Caen. Faculty of sciences: BESSON, professor of chemistry. School of medicine: CHRÉTIEN, professor of chemistry.

Clermont. Faculty of sciences: CHAVASTELON, professor of chemistry. School of medicine: HUGUET, professor of chemistry.

Dijon. Faculty of sciences and School of medicine: PIGEON, professor of chemistry. Faculty of sciences: METZNER, adjunct professor of industrial and agricultural chemistry.

Grenoble. Faculty of sciences: RECOURA, professor of chemistry, known for his researches in inorganic chemistry; FLUSIN, professor of electrochemistry and electrometallurgy, who is also associated with the Institut Électrotechnique.

Lille. Faculty of sciences: LEMOULT, professor of general chemistry; BUISINE, professor of industrial and agricultural chemistry and director of the institute of chemistry. Among the other chemists in this faculty may be mentioned: Faculty of medicine: LAMBLING, professor of organic chemistry; LESCŒUR, professor of



(1) ALFRED DITTE (1843-1908) (4) H. DEBRAY (1827-1888)
 (2) PAUL HAUTEFEUILLE (1836-1902) (5) L. TROOST
 (3) HENRI STE.-CLAIRE DEVILLE (1818-1881) (6) ALEXANDRE JOLY (1845-1897)
 (From a painting in the Sorbonne)

inorganic chemistry and toxicology. There are also at Lille chairs of chemistry in the "Facultés libres" of medicine and sciences.

Lyon. Faculty of sciences: BARBIER, professor of chemistry, an eminent organic chemist, well known for his numerous researches in the determination of constitution and on reduction; VIGNON, professor of industrial and agricultural chemistry; and several others. Faculty of medicine: HUGOUNENQ, professor of medical chemistry, known for his spectroscopical work; MOREL, professor of organic chemistry; and several others.

Marseille. Faculty of sciences: PERDRIX, professor of general chemistry; RIVALS, professor of industrial chemistry. School of medicine: MOITESSIER, professor of medical chemistry.

Montpellier. Faculty of sciences: DE FORCRAND, professor of chemistry, known for his investigation upon heterogeneous equilibrium, thermochemistry, and thermodynamics; OECHSNER DE CONINCK, professor of chemistry, and likewise a well-known investigator; in this faculty there are also several other chemists. Faculty of medicine: VILLE, professor of medical chemistry.

Nancy. Faculty of sciences: MULLER, professor of physical chemistry; PETIT, professor of agricultural chemistry; WAHL, professor of industrial chemistry; GUNTZ, professor of inorganic chemistry and director of the Institut Chimique, known for his researches on lithium and barium; GRIGNARD, professor of organic chemistry, winner of the Nobel prize for his researches upon organomagnesium compounds, author of "Sur les combinaisons organomagnésiennes mixtes et leurs applications" (Lyon, 1901); MINGUIN, professor of chemistry; GUYOT, professor of the chemistry of dyeing and printing. Faculty of medicine: GARNIER, professor of medical chemistry.

Poitiers. Faculty of sciences: ROUX and BODROUX, professors of chemistry. School of medicine: SAUVAGE, professor of chemistry.

Rennes. Faculty of sciences: BOUZAT, professor of chemistry. School of medicine: LENORMAND and LAURENT, professors of chemistry.

Toulouse. Faculty of sciences: Paul SABATIER, professor of chemistry and director of the institute of chemistry, whose researches upon catalytic organic reductions have been awarded the Nobel prize, author of "La Catalyse en Chimie organique" (Paris, 1913); GIRAN, professor of chemistry; FABRE, professor of agricultural and industrial chemistry and director of the Station Agronomique. Faculty of medicine: ALOY, professor of chemistry. At the Faculté libre of Toulouse, l'abbé SENDERENS, the collaborator with Sabatier in his important researches, is professor of chemistry.

CRIMINOLOGY

CRIMINOLOGY¹

Ever since the famous reports of LA ROCHEFOUCAULD-LIANCOURT to the National Assembly in 1790 and 1791, France has been a center of lively interest in the subject of criminalistics. His studies of mendicity, reformatories, poor relief, and the Philadelphia prison system, have been guide-posts for a century. But even before that, VOLTAIRE had popularized the ideas of Beccaria. The tradition was carried on in the nineteenth century by great sociologists like QUÉTELET, who laid the foundations of criminal statistics; by great publicists like DE TOCQUEVILLE, who added a strand to the bonds between France and America by his notable report on the penitentiary system in the United States and its application in France (1833); by great physiologists like LAUVERGNE, who anticipated some of Lombroso's theories; by great men of letters like LAMARTINE, who thought it no condescension to offer to the cause of neglected childhood some of his most masterly eloquence; and by great medical men like MOREL and DESPINE, who blazed new paths in criminal psychiatry. The whole nineteenth century was a period of free trade between these two republics in the field of charities and correction. France borrowed ideas of prison administration. America in return imported both ideas and men for developing our system of caring for the blind, deaf-mutes, feeble-minded, and insane. Recently France

¹[Drafting Committee: C. A. ELLWOOD, University of Missouri; MAURICE PARMELEE, College of the City of New York; A. J. TODD, University of Minnesota.—ED.]

once more exemplified the same principle by taking over from us the Juvenile Court. Another illustration may be found in the proposal by TARDE to substitute our system of electrocution for the guillotine as the best method of capital punishment. Finally, it is not too much to say that the American system of the indeterminate sentence and parole is to no small degree the child of French inspiration. For it appears that the first public proclamation of the principle of conditional liberation of prisoners came through a remarkable address of BONNEVILLE DE MARSANGY at Rheims in 1846; this address (translated and published by F. H. Wines in 1866) formed one of the foundation stones of our Elmira Reformatory System.

France, then, offers two fields for the student of criminalistics: penal administration and criminology proper.

The French School of Criminology. The tendency of the French criminologists has been to lay special emphasis upon the influence of the environment in the causation of crime. Consequently, the so-called "French School" of criminology has frequently been called the "school of the environment." This tendency has been due in part to an attempt to oppose and counteract the tendency of the Italian criminologists to put excessive emphasis upon the influence of pathological and abnormal anatomical and physiological traits in the causation of crime. It has also been due to the important place given in France to the study of law, politics, and the social sciences.

At the same time the notable achievements of the French in physiology, psychology, and anthropology have had their influence upon the development of criminology in that country. A number of careful studies have been made of the physical traits of criminals, and



GABRIEL TARDE (1843-1904)
(From the monument by Injalbert)

CRIMINOLOGY

much attention has been given to the psychiatric aspect of crime. Legal medicine has been developed in France perhaps further than in any other country.

Criminologists. Two French criminologists deserve special mention. One of them is the sociologist, the late Gabriel TARDE, who was at first a provincial magistrate, later chief of the Bureau of Statistics, and then professor at the Collège de France in Paris. In all of his criminological writings his principal effort was to analyze the influence of the social factors in the causation of crime. Among his books are "La philosophie pénale" (translated into English), "La criminalité comparée," "Études pénales et sociales," "Les transformations du droit," "Les transformations du pouvoir."

The other is Alexandre LACASSAGNE, professor of legal medicine at the University of Lyon, and founder and editor of the leading criminological journal in France (and perhaps in the world), the "Archives d'Anthropologie criminelle, de Médecine légale, et de Psychologie normale et pathologique." Lacassagne has, in a sense, been the official spokesman of the French school of criminology. He is the leader of a group of criminologists who have been very active in research work and in criminological publication. He has written voluminously on the statistical and other social aspects of crime, while his medico-legal treatises make him one of the leading authorities in the world on the subject of legal medicine.

A. CORRE has published several valuable books containing both general and specialized studies of the causes of crime: "Crime et suicide," "Les criminels," "L'ethnographie criminelle" (with P. Aubry), "Documents de criminologie retrospective." E. LAURENT has made special studies on prisons, and has also written about

the general problems of criminology: "Les habitués des prisons de Paris," "Le criminel," "L'anthropologie criminelle et les nouvelles théories du crime." C. PERRIER has made special studies on prisons: "Les criminels," "Emprisonnement et criminalité." H. JOLY has published numerous works containing many statistical data: "Le crime," "La France criminelle," "L'enfance coupable," "La Belgique criminelle," "Problèmes de science criminelle." L. PROAL, a magistrate, has written voluminously and graphically: "Le crime et la peine," "La criminalité politique," "Le crime et le suicide passionnels." J. MAXWELL, a public prosecutor, has written scholarly works on the nature of crime: "Le crime et la société," "Le concept social du crime." G. VIDAL has published voluminous compilations of criminal law and of the data of modern criminological science: "Principes fondamentaux de la pénalité dans les systèmes les plus modernes," "Cours de droit criminel et de science pénitentiaire." J. DALLEMAGNE has prepared several useful little handbooks of the different aspects of criminology: "Les théories de la criminalité," "Les stigmates anatomiques de la criminalité," "Les stigmates biologiques et sociologiques de la criminalité."

Criminology in the Universities. In all of the law schools are given courses on criminal law and procedure. In the medical schools of the universities of Paris, Bordeaux, Lille, Lyon, Montpellier, Nancy, and Toulouse, are given courses on legal medicine. The two universities at which the facilities for studying criminology are sufficiently extensive to require special mention are these of Paris and Lyon.

At the University of Paris, in the law school are given courses on criminal law and penology by GARÇON and LE POITTEVIN. There is a special seminary room for



RENÉ BÉRENGER (1830-)

CRIMINOLOGY

students of criminology. A diploma is given for special studies in penal science ("Certificat de science pénale"). In the medical school are given courses in legal medicine by THOINOT and RIBIERRE. There is a laboratory and an institute of legal medicine. To those who qualify is given the diploma of medico-legal expert (médecin légiste). In addition to these medical and legal courses should be noted the courses of DURKHEIM, which correlate closely criminalistics with other social phenomena. In addition to the courses in the University, courses of interest to students of criminology are frequently given in various other educational institutions in Paris. Among these are the Collège de France, École d'Anthropologie, Institut général Psychologique, École libre des Sciences Politiques, École des Hautes Études Sociales, Collège libre des Sciences Sociales.

At the University of Lyon, where LACASSAGNE is the chief figure, special courses in penology are given in the law school. Courses on legal medicine are given in the medical school, and there is a celebrated medico-legal laboratory.

In Paris an extensive criminological literature is to be found in the Bibliothèque Nationale, and in the library of the Law School. The Musée Social also affords some facilities in this line. At the Palais de Justice, where BERTILLON worked out his famous anthropometric system of identification, are the identification bureau and the school for teaching identification methods to the police. The Société Générale des Prisons holds frequent meetings of interest to students of criminology. There are several prisons in or near Paris illustrating different types of prisons, among them the Prison de la Santé, La Petite Roquette, etc.

There are many other penal institutions in France worthy of inspection; perhaps the most famous of these

is the Colonie de Mettray, a pioneer in juvenile reformatories.

At the University of Lyon are a museum of legal medicine and a museum of criminal anthropology.

Penal Administration. The large number of "patronages," particularly for the care and protection of neglected and delinquent children in Paris, Lyon, Le Havre, and other large cities, offer opportunity for research into both causative and preventive factors in crime. Nor should the "Tribunaux pour enfants et adolescents" be overlooked. So important has this juvenile court movement become that a special journal, the "Revue des Tribunaux pour Enfants," was founded in 1913. Its collaborators include Senator BÉRENGER (the great philanthropist who fathered the probation system of 1891), Professors CUCHE of Grenoble, GARÇON and LE POITTEVIN of Paris, GARRAUD of Lyon, and such distinguished advocates and judges as ALBANEL, FLORY, LEMERCIER, PRÉVOST, PRUDHOMME, ROBERT, ROLLET, TEUTSCH, and VIDAL-NAQUET. The famous psychological clinic founded by BINET at the University of Paris furnishes opportunities for co-ordinating this study of juvenile delinquency; the so-called "Binet-Simon scale" is the basis for most of the psychopathic testing employed in American courts and institutions.

Finally, the admirable statistical service of both national and municipal bureaus offers to the student unusual opportunities for access to bodies of statistical fact and also for training in statistical method. The French official "Compte général de l'administration de la justice," beginning in 1826, is the longest systematic record available for any country in the world.

EDUCATION

EDUCATION¹

Educational theorists have never been lacking in France, as names like RABELAIS, MONTAIGNE, and ROUSSEAU easily indicate. In French educational history during the nineteenth century, names like GUIZOT, DURUY, FERRY, PÉCAUT, GRÉARD, BUISSON, COMPAYRÉ, and LIARD, come most readily to mind. Of these, all save Pécaut and Compayré will go down in history as organizers or administrators. PÉCAUT, of sweet spirit, is the only one who lives pre-eminently as a teacher. COMPAYRÉ enjoys relatively greater renown outside France than in his native country. BUISSON, encyclopedist, administrator, professor in the University of Paris, and for many years an active and influential member of the Chamber of Deputies, still lives in Paris. Buisson worked hand and glove with Jules Ferry in effecting the great reforms of the early '80's which veritably made the present system of primary education in France. LIARD, of eloquent speech and true pedagogical insight, the worthy successor of Gréard as vice-rector of the University of Paris, has long wielded a powerful influence in university and secondary circles at the French capital.

DUPANLOUP, QUINET and MICHELET, Jules SIMON and Michel BRÉAL, MARION, LAVISSE, FOUILLÉE, GUYAU and PÉREZ, Madame PAPE-CARPENTIER and Madame

¹ [Drafting Committee: JOHN DEWEY, Columbia University; FREDERIC E. FARRINGTON, U. S. Bureau of Education; PAUL H. HANUS, Harvard University; CHARLES H. JUDD, University of Chicago.]

KERGOMARD, BINET and RIBOT (these latter two, psychologists), have all made valuable contributions to the development of educational thought.

But during the past hundred years French educators have been nothing if not practical. Teacher-training has loomed large in French educational life. In support thereof one has only to cite the centenary of her higher normal school, celebrated over two decades ago, and the hundred and sixty or more primary normal schools, scattered through the various departments, to say nothing of the girls' higher normal schools, two higher primary normal schools, as well as other teacher-training institutions—all included within an area less than three-quarters the size of Texas.

In all these training schools, three aims have been constantly kept to the fore: The student should know his subject thoroughly; he should know more than his subject; and he should know how to teach his subject. It may fairly be asserted that during the past generation no country in the world has succeeded better than France in accomplishing this triple purpose in teacher-preparation.

Curricula, courses of study, methods of instruction and organization, textbooks, and innumerable other details are regulated by a central authority, usually at Paris itself, after carefully culling the best ideas from the educational leaders of the country. A system organized on such a basis may make less striking innovations in educational procedure, and may reduce the opportunities for experimentation and scientific work, but at the same time it conduces to more consistent educational progress. In fact, long before the term gained general acceptance, France was following a kind of pedagogical pragmatism in the conduct of its educational affairs. In a word, France has little to offer



FERDINAND BUISSON (1841-)

EDUCATION

the foreign student in the way of mere formal study of educational theory as a university subject, much less does it hold out any inducement to the mere seeker after academic distinction.

On the other hand, for the educator of mature mind, able to use his educational theory as a tool, capable of observing, judging, and evaluating educational organization and practice, France offers an almost virgin field for study. With a highly organized educational system in full working order, with practically every type of educational institution in successful operation, France yields to no other country in the world in the excellence of its individual institutions of learning. These are well worth the study of the professional educator, from the University with its traditional faculties, as well as its more modern adjuncts (to say nothing of independent institutions of university grade like the Collège de France, the École des Hautes Études Sociales, the Institut Océanographique, and the like), through its famous old lycées and other types of secondary schools, its various grades of scientific and technical schools, its commercial, industrial, and agricultural schools, all the way down to the modest primary school. Each type or each school has an organization and in many cases a methodology of its own.

In view of the practical trend in French education, the absence of education courses, in the narrow sense of the term, occasions no surprise. In the University of Paris, only one professor, DURKHEIM, lectures in that field, announcing three courses under the general caption: Science of education and sociology. One of these courses is in ethics; one is concerned with the history of pedagogical doctrines; and one is a practical course designed to meet the needs of candidates for the master's

degree. What may be called special method courses, however, are very numerous in the faculty of letters. In 1914-15, for example, fourteen of the twenty-five instructors giving courses in history, and four of the five giving courses in geography, announced special work for candidates for the higher certificates or degrees. DURKHEIM, who enjoys an international reputation as a sociologist through his work on "Suicide," was called from Bordeaux some years ago as successor to the late Henri MARION.

Some attention is given to educational theory in the course of the École Normale Supérieure, as well as in several of the other teachers' training schools in the Academy of Paris, but admission to these courses may be obtained only by special dispensation.

Courses in educational theory are likewise few in the provincial universities. Six¹ of the fifteen other universities announce courses in education, viz.: Besançon offers one course in psychology applied to education, and another in practical pedagogy; Dijon and Toulouse give the work under "philosophy and pedagogy"; Grenoble, Lille, and Lyon use the caption "science of education." What has been said of the general nature of the work at Paris is likewise true of that offered at the provincial universities.

Despite the lack of theoretical courses in education in the French universities, there is a wide field for historical research which has scarcely been touched. We in this country know little about the historical development of French institutions. Most of our history of education has come to us from Germany by way of direct translation of German treatises. Barnard's great contributions

¹ Data on this particular topic are those given in "l'Annuaire de l'instruction publique" for 1913, the latest available information.

to our knowledge in this field came from German sources. (It is interesting in passing to note that his promised volume on French educators was never written). Yet the first great university was founded in Paris; the most powerful teaching body the world has ever seen was organized in Paris by Loyola; Ramus, Rollin, and Rolland d'Erceville were all important men in the development of education in France, yet one searches in vain through the index of the most comprehensive text in the history of education published in this country for even a mention of their names. Rashdall in his scholarly "Universities of Europe during the Middle Ages," and Dénifle and Chatelain in their monumental "*Chartularium universitatis Parisiensis*," have set the standard in their contributions to early university history. For the ensuing six hundred years, save for accounts of the more famous educational theorists, the whole development of education in France is well-nigh inaccessible in English. This offers a great field for research.

Paris is strikingly a city of libraries. Their number is legion, and includes almost every conceivable subject. Many of these libraries contain works bearing upon education in some of its phases. By far the most valuable of the pedagogical libraries, and fortunately the one most readily accessible to the student, is the Bibliothèque de l'Enseignement Public, at the Musée Pédagogique, 41 rue Gay-Lussac. Here one finds a collection of some 75,000 volumes, unfortunately not all catalogued in the most approved fashion. This, however, is one of the great educational libraries of the world, and every facility is afforded for research work; its collection of American school-texts of the mid-nineteenth century is surprisingly large. Other libraries may be consulted for special fields of educational study, notably the library of the Ministry of Commerce and Industry for all

material relating to technical (i. e. commercial and industrial) education. The serious and qualified student of educational problems will find every door open and every courtesy extended by the authorities of our sister republic.

ENGINEERING

ENGINEERING¹

The teaching of the fundamental sciences of mathematics, mechanics, physics and chemistry, as well as the application of these sciences to the solution of engineering problems, calls for clear thinking and for rational and logical mental processes. Should we not then turn to France, the land of clear thinking *par excellence*, for illuminating and inspiring instruction in sciences, both pure and applied? The French mind, to which obscurity is as abhorrent as vacuum is to nature, is peculiarly fitted to grasp and to teach the physical laws of nature and their application, and France has given to the world a rich galaxy of eminent scientific thinkers and discoverers.

It will suffice for our purpose to name a few of the great French engineers whose achievements have made them famous. Such are Ferdinand DE LESSEPS, the builder of the Suez Canal; EIFFEL, who conceived and constructed the tower that bears his name; PERRONNET, PONCELET, HENNEBIQUE and MESNAGER, civil engineers of world-wide reputation; SAUVAGE and COUCHE in railroad engineering; Sadi CARNOT, the discoverer of some of the most fundamental laws of thermodynamics; Étienne LENOIR; Beau DE ROCHAS and Fernand FOREST, who by their pioneer work in the development of the internal combustion engine prepared the way for the automobile and the

¹ [Drafting Committee: IRA N. HOLLIS, Worcester Polytechnic Institute; HENRY M. HOWE, Columbia University; ALEX. C. HUMPHREYS, Stevens Institute of Technology; ALBERT SAUVEUR, Harvard University.—ED.]

aeroplane; GRAMME, who developed the dynamo-electric machine, and took an important part in the discovery that dynamo machines are reversible, i.e., capable of being employed as motors; BAUDOT, the designer of a multiplex system, extensively used; Marcel DEPREZ, who was a pioneer in the electric transmission of power; FOUCAULT, who first discovered the losses of power in dynamos due to eddy currents; MASCART; JOUBERT; HOSPITALIER; André BLONDEL and Maurice LE BLANC, all of whom made important contributions to electrical engineering science and standards; the illustrious AMPÈRE and COULOMB, who, though generally classified as physicists, have powerfully contributed through their basic discoveries to the progress of applied electricity; ÉLIE DE BEAUMONT; COMBES; CALLON; HAÛY; Albert DE LAPPARENT; Haton DE LA GOUPILLIÈRE; DE LAUNAY; DAUBRÉE, all mining engineers or geologists who have contributed largely to engineering progress.

In metallurgy may be mentioned SAINT-CLAIRE DEVILLE, whose laboratory experiments opened the way to much metallurgical progress; RÉAUMUR, who discovered the process by which castings of cast-iron may be made malleable and which today is of great industrial importance; MOISSAN, who in his electric furnace first succeeded in reducing oxides hitherto deemed unreducible, and produced a whole series of new carbides; GRUNER, to whom we owe many of our scientific conceptions of the complex reactions of the iron blast furnace; Pierre MARTIN, who first succeeded in manufacturing steel in an open-hearth furnace; OSMOND, the father of metallography; HÉROULT, who (though ignorant of the work done at the time by the American metallurgist, Hall) invented the electrolytic method of extracting metallic aluminum from its ores, and whose electric furnaces are playing an increasingly important part in the metallurgy of steel;

POURCEL, who contributed so much to the early introduction of the Bessemer process on the Continent, and was a pioneer in the manufacture of ferro-manganese; Henri LE CHATELIER, eminent chemist and metallurgist, whose inventions of the thermo-electric pyrometer, and numerous other contributions, have made possible much important progress in the art of treating metals; SCHNEIDER, of the Creusot Steel Works; Léon GUILLET and George CHARPY, productive workers of great talent.

Several of the living engineers mentioned above are professors in some of the French engineering schools (LE CHATELIER, MESNAGER, DE LAUNAY, GUILLET, and others).

Instruction. Applied science in its many ramifications is taught in France in a large number of institutions. In Paris alone not less than fourteen well-known schools are devoted to technical teaching, namely: (1) Conservatoire National des Arts et Métiers, (2) École Nationale Supérieure des Mines, (3) École Nationale des Ponts et Chaussées, (4) École Centrale des Arts et Manufactures, (5) École Professionnelle Supérieure des Postes et Télégraphes, (6) École Spéciale des Travaux Publics, du Bâtiment et de l'Industrie, (7) École Municipale de Physique et de Chimie Industrielles, (8) École Nationale des Arts et Métiers, (9) École Supérieure d'Électricité, (10) École d'Électricité et de Mécanique Industrielles, (11) École Pratique d'Électricité industrielle, (12) École Breguet (électricité et mécanique), (13) École Spéciale de Mécanique et d'Électricité, and (14) École Supérieure d'Aéronautique et de Construction Mécanique. Important schools of Business Administration, of Architecture, of Agriculture, and of Military Engineering, are also located in Paris.

Applied science is likewise part of the teaching of nearly all the provincial universities. These universities

are situated at Aix-Marseille, Besançon, Bordeaux, Caen, Clermont, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Poitiers, Rennes, and Toulouse.

Confining our attention to the teaching of Engineering, the most important engineering schools of France are here briefly mentioned. It is believed that each of them will heartily co-operate in any effort tending to facilitate the enrollment of foreign students by removing the obstacles which in the past have stood in the way. The entrance requirements for foreign students here mentioned are those in force before the War. It is not unlikely that, in some instances at least, they may be materially modified.

École Polytechnique (Paris). This ancient and famous institution does not confer engineering degrees, but gives instruction preparatory only to professional studies in engineering or in military science.

The fact that one hundred and twenty-three of its graduates have become members of the Institute of France testifies to the broadness and excellence of its teaching. Of these, eight have become members of the Académie Française (the list includes DE FREYCINET, POINCARÉ, Marcel PRÉVOST); ninety-six, members of the Académie des Sciences (including ARAGO, Élie DE BEAUMONT, CAUCHY, GAY-LUSSAC, DULONG, A. C. BECQUEREL, H. BECQUEREL, REGNAULT, LE CHATELIER, MICHEL LÉVY, DE LAPPARENT); seven, members of the Académie des Sciences Morales et Politiques; nine, members of the Académie des Inscriptions et Belles Lettres; and three, members of the Académie des Beaux Arts. Among other illustrious graduates of the École Polytechnique the following may be cited: Auguste LE COMTE, SADI-CARNOT, Admiral COURBET, General DE MIRIBEL, Haton DE LA GOUPILLIÈRE. The School offers a two-year program including instruction in Calculus, Geometry,

Mechanics, Physics, Chemistry, Astronomy and Geology, History and Literature, Political and Social Economy, Architecture and drawing.

Foreign students are admitted to the School as day students only and after passing successfully a special entrance examination. Successful completion of the work generally admits students to such schools of applied science as the *École Nationale des Ponts et Chaussées*, *Génie Maritime*, etc. Foreign students pay no tuition fees.

École Nationale supérieure des Mines. The *École des Mines* is one of the oldest in the world, having been founded in 1783. Many of its graduates have become illustrious. The list includes Joseph BERTRAND, RÉSAL, Henri POINCARÉ, BERTHIER, CAILLETET, RIVOT, REGNAULT, DELAUNOY, POTIER, CORNU, DUFRÉNOY, Élie DE BEAUMONT, MALLARD, Marcel BERTRAND, DE LAPARENT, COMBES, CALLON, GRUNER, Paul HÉROULT, SAUVAGE, COUCHE, LE CHATELIER. Among the many Americans who have in the past studied at the *École des Mines*, the names of Egleston, who later helped to found the School of Mines of Columbia University, and of Eckley B. Coxe, the eminent mining engineer, are conspicuous.

Admission to the School is by competitive examination in Algebra, Calculus, Trigonometry, Analytical Geometry (plane and solid), Descriptive Geometry, Mechanics, Physics and Chemistry. Students are also admitted as "auditeurs libres" to some of the courses.

The instruction covers a period of three years and includes courses in Mineralogy and Petrography (GRANDJEAN), in Palaeontology (PAINVIN and ZEILLER, both members of the Institute), Geology (TERMIER, member of the Institute, and DE LAUNAY), Mining (LEBRETON),

Metallurgy (ANGLÈS DAURIAC), Analytical Chemistry (CHESNEAU, director of the School), Mechanics (SAUVAGE), Railroad Engineering (LEGRAIN, General Manager of the State Railroads), Resistance of Materials (HUMBERT), Industrial Electricity (LENARD), Mining Laws (AQUILLON), Industrial Economics (PELLETAN).

The library contains over 50,000 books, pamphlets or maps and receives over 300 periodical publications. Its collections of mineralogy (over 30,000 specimens), palaeontology, and geology are famous and occupy 50 large rooms. Fully equipped laboratories for Chemistry, Electricity, Mechanics, Mineralogy and Petrography, Metallurgy, Physics, and Surveying are maintained.

The degree conferred on foreign students is that of "Ingénieur Civil des Mines," or else a certificate of study. The tuition fee is 1000 francs per year.

École Nationale des Ponts et Chaussées (Paris). This important school was founded in 1747 and its reputation is universal. Admission is by competitive examination in Algebra, Trigonometry, Analytical Geometry (plane and solid), Descriptive Geometry, Mechanics, Physics, Chemistry, Free Hand Drawing. Students are also admitted as visitors to some of the courses.

The School offers a two-year program including instruction in Applied Mechanics (PIGEAUD, MOURET), Construction (LAUNAY), Road Building (LIMASSET), Railroad Engineering (FOUAN), Applied Electricity (Guillebot DE NERVILLE), Mineralogy and Geology (DE LAUNAY), Architecture (BONNET), Law (CHAREYRE, ROMIEU), Materials of Construction and Reinforced Concrete (MESNAGER), Metal Bridges (RÉSAL), Masonry Bridges (SÉJOURNÉ), Naval Works (DE JOLY), Internal Navigation (DUSUZEAU), Steam Engines and other Thermal Engines (WALCKENAER), Hydraulics (IMBEAUX), Political Economy (COLSON).



HENRI LE CHATELIER (1850-)

ENGINEERING

The School confers the degree of "Ingénieur des Constructions Civiles" or a certificate of study. There is no tuition fee.

École d'Application du Génie Maritime (Paris). Admission to this School is by competitive examination, including Calculus, Descriptive Geometry, Mechanics, Drawing, Physics, and Chemistry. Properly qualified foreign students may be admitted without examination. Visitors ("auditeurs libres") are also permitted to attend some of the courses.

A two-year course is offered, consisting of winter sessions in Paris and of summer work in arsenals and ship yards. The instruction, conducted by officers of the Génie Maritime and by engineers of Naval Artillery, includes courses in Ship Construction, Armament and Protection, Applied Mechanics, Steam Engines, Boilers, Metallurgy, Technology (Tools and Materials), Aeronautics, Naval Architecture, Land Construction, Torpedoes, Administration and Bookkeeping, Submarines, Applied Electricity, Resistance of Materials, Naval Artillery, Graphic Problems and Projects.

The school confers the degree of "Ingénieur Civil des Constructions navales" or a certificate of study. The cost of instruction to foreign students is about 1800 francs per year.

École Supérieure d'Électricité (Paris). Admission to this important School is by competitive examination, including Mathematics (Algebra, plane analytical Geometry, Calculus), general and applied Mechanics, Physics, Chemistry, Electricity, and Resistance of Materials. Properly qualified students may be excused from the entrance examination. Visitors ("auditeurs libres") are also admitted. The studies, which last one year, include instruction in Applied Electricity (construction, generation, transformation, transmission,

utilization, thermal and chemical application, tests and measurements), in Theoretical Electricity, and in Telegraphy and Telephony. Visits and projects are part of the work. The School also offers a three months' course in Wireless Telegraphy.

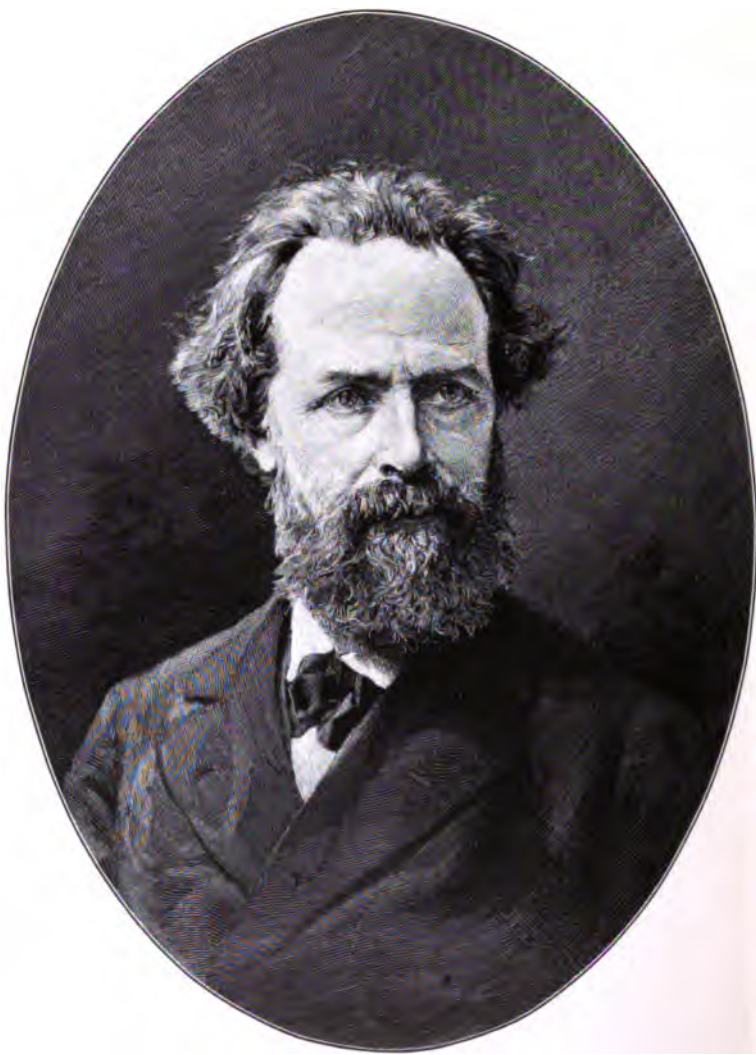
The degree conferred is that of "Ingénieur Électricien." The tuition fee is 1000 francs for the regular course and 750 francs for the course in Wireless Telegraphy.

École Centrale des Arts et Manufactures (Paris). Admission to the School is by competitive examination in Mathematics, Physics, and Chemistry. It offers a three-year program, including instruction in Calculus, Descriptive Geometry, Mineralogy and Geology, Architecture and Civil Construction, Hygiene, Drawing, Public Works, Mining Methods, Metallurgy (general and specific), Construction of Machinery, Mechanics (theoretical and applied), Industrial Application of Inorganic and Organic Chemistry, Railroading, Physics (general and industrial), Analytical Chemistry, Industrial Electricity, Resistance of Materials, Engineering of Construction, Thermal Engines, Industrial Law.

The School confers the degree of "Ingénieur des Arts et Manufactures," or else a certificate of study. The tuition fee is 900 francs the first year and 1000 francs for each of the following years.

Institut Chimique de l'Université de Nancy (Nancy; Meurthe et Moselle). Students are admitted on the presentation of certificates from preparatory schools of good standing (lycées, high schools, etc.) or by examination in mathematics, physics, chemistry, etc. Two years are devoted to the study of theoretical and practical chemistry and one year to specialized work. The degree of "Ingénieur Chimiste" is conferred. The tuition is 650 francs per year.

GEOGRAPHY



ÉLISÉE RECLUS (1830-1905)

GEOGRAPHY

GEOGRAPHY¹

The development of Geography as a university study is of about as recent a date in France as in other European countries. Cartography at home and exploration abroad have flourished longer.

The maps of France, published on various scales and styles by the Service Géographique de l'Armée and other official departments, are of unusual excellence; the contoured sheets for Algeria on a scale of 1:50,000 are admirable specimens of topographic art. But (as is generally the case) the topographers who have produced these fine maps have left to others the development of a scientific method of accurately and intelligibly describing in words the facts of form and distribution which maps portray graphically. A partial exception to this statement is found in General BERTHAUT's "Topologie" (1909-10), in which many beautiful examples of topographic work are reproduced, but the text savors of an earlier century than the 20th.

French explorers of oceans and continents have deservedly gained renown for bringing to light the existence of previously unknown lands and waters; but, like most other explorers, those of France have not contributed greatly to the systematic aspects of modern geographical science. The great SOCIÉTÉ DE GÉOGRAPHIE of Paris gives opportunity for study in its extensive library, supports exploration with its funds, publishes the results in its journal, "La Géographie,"

¹ [Drafting Committee: W. M. DAVIS, Harvard University; R. H. WHITBECK, University of Wisconsin.— Ed.]

and rewards them with its medals. But, like nearly all other large geographical societies, its activities are more associated with popularization than with research; and the same is true of several smaller geographical societies elsewhere in France. Certain societies of commercial geography have also been founded, but their publications seldom contain anything more than an elementary geographical basis for studies that are largely of a statistical or economical nature.

The great compilers, MALTE-BRUN early in the 19th century and RECLUS near its close, each produced a "Géographie universelle" in many volumes that will endure as monuments to the authors' patience and erudition; but these works were completed before the philosophy of evolution, inorganic and organic, had given to geography its modern scientific spirit, and they no longer serve as models for geographic treatment.

In more recent years the higher study of geography in France has advanced in two directions: first in physical geography, under the inspiration of DE LA NOÉ and DE MARGERIE, whose "Formes du Terrain" (1888) revealed new lines of research in an old subject, and later under the leadership of the eminent geologist, DE LAPARENT, whose "Leçons de géographie physique" (1896) attracted renewed attention to the modern aspects of the study of land forms; secondly in descriptive geography, under the leadership of VIDAL DE LA BLACHE, whose earlier training was in history. In the first of these directions, BARRÉ has prepared an excellent local work, "L'architecture du sol de la France" (1903), and DE MARTONNE has produced a systematic work, "Traité de Géographie physique" (1907, 1913), which is today recognized as of standard value. But it is in the second direction that geography has recently flourished in France; for, although its leader has now retired from teaching, nearly all the

more notable modern geographical studies in France are the work of his pupils, or of his pupils' pupils, a goodly number of whom have become professors of geography in French universities. Among the recent works thus and otherwise inspired the following deserve especial mention: SCHIRMER, "Le Sahara" (1893), DELEBECQUE, "Les lacs français" (1898), BRUNHES, "L'irrigation" (1902), DE MARTONNE, "La Valachie" (1902), BERNARD and LACROIX, "L'évolution du nomadisme en Algérie" (1906), BLANCHARD, "La Flandre" (1906), VALLAUX, "La Basse-Bretagne" (1907), VACHER, "Le Berry" (1908), PASSERAT, "Les plaines du Poitou" (1909), DEMANGEON, "Le relief du Limousin" (1910), LEVAINVILLE, "Rouen" (1913), SORRE, "Les Pyrénées méditerranéennes" (1913). The "Annales de Géographie," founded in 1893 by VIDAL DE LA BLACHE and still edited by him in collaboration with DE MARGERIE and GALLOIS, is an important medium of scientific publication; its "Bibliographie annuelle," compiled by RAVENEAU and many collaborators, is an indispensable aid in serious study.

Instruction. The French School of Geography is today, since the retirement of its founder, chiefly in the hands of his former pupils who are now professors in various universities. While their work is sufficiently marked by individuality, it nevertheless bears the imprint of their master, whose attractive but not always specific style may be studied in his noted volume, "La France, Tableau géographique" (1903, 1908), prepared as an introduction to Lavissee's History of France. He has been engaged for several years past, in conjunction with a number of his disciples, on a regional geography of the world, the volumes of which are awaited with interest.

The leading characteristic of this school is a devoted studiousness, the natural result of the severe discipline of the "agrégation," or competitive examination, held in Paris, and based on a specified course of advanced geographical study, which must be taken by all candidates for teaching positions in France and in which only as many candidates are passed as are needed to fill vacant positions. During the assiduous preparation for this examination and in the preparation of the thesis which accompanies it, every pertinent element is gathered from geology, geography, and biology, and above all from history, with the intent of finally combining all these elements in regional descriptions. The product of this intent is, in the opinion of some critics, too geological at its beginning, too historical at its end, and not systematic enough through much of its course to represent the finest geographical ideal. But it is still an admirable product, worthy of attentive examination by American students, even though its imitation in this country may be difficult because our historical records are for the most part so brief and scanty,—to say nothing of its being unnecessary because at present the demand for geographical scholarship is in most of our universities so small.

It is naturally in Paris and at the *Sorbonne* (as that part of the University of Paris is called which is directed by the Faculties of Letters and of Sciences) that the French school of Geography is best exemplified. Here the courses and laboratories in general geography, developed under the Faculty of Letters by VIDAL DE LA BLACHE, and under the Faculty of Sciences by VÉLAIN (courses and laboratories which it is to be hoped will be united and administered under a single geographical institute), are now, since the retirement of their seniors, carried on by GALLOIS, DEMANGEON, DE MARTONNE,



EMMANUEL DE MARTONNE (1873-)

GEOGRAPHY

and their associates. In more or less close association with the Sorbonne are various additional establishments: the *Collège de France*, where BRUNHES lectures on human geography; the *Institut océanographique*, founded by the Prince of Monaco, where lectures and conferences are held; and other institutions where subjects allied to geography may be pursued. Inter-university excursions, ordinarily held in the spring, give practical but brief experience in field study.

The fourteen provincial universities of France offer less expanded opportunity for geographical study than is found in Paris, yet in many of them certain lines of work are well developed and may be pursued to much advantage. Thus, FLAHAULT has made a specialty of plant geography at Montpellier, and BLANCHARD of alpine geography at Grenoble. The situation of these universities necessarily exercises much influence over the subdivisions of geography which they can best illustrate. Thus, commercial and colonial geography have exceptional encouragement at Bordeaux; features of volcanic origin are best exemplified at Clermont-Ferrand in the classic region of Auvergne; unusually varied opportunity for the study of *cuestas* in their influence on population and history is afforded in the neighborhood of Nancy; coastal features of large variety and practical importance in maritime relations are found near Rennes. An advantage which students may enjoy at the smaller universities is the close personal association with their professors, which counts for so much in advanced work.

GEOLOGY
INCLUDING
MINERALOGY, PETROLOGY,
AND PALAEONTOLOGY

GEOLGY¹

The part which France has played in the long history of geological science is a particularly distinguished one. In the controversial period of rival schools of geology, which preceded that of careful observation, she was fortunate in not being drawn within the charmed circle of the followers of Werner at Freiberg, where the sedimentary origin of basalt was proclaimed and hotly defended. It was in France, through the work of GUETTARD and DEMAREST, that this colossal error, which held back for decades the development of the science, was finally overthrown. As regards the other dominant error which characterized eighteenth century geology—the elevation crater idea of the Prussian geologist von Buch—France was less fortunate, for one of her most brilliant geologists, Élie DE BEAUMONT, fell under the spell of this delusion.

When, with the dawn of the nineteenth century, geology developed as an observational science, largely in the fields of stratigraphy and palaeontology, the contributions of French geologists were noteworthy. It is necessary only to mention the names of CUVIER, LAMARCK, d'ARCHIAC, d'ORBIGNY, and BRONGNIART, to confirm this statement. CUVIER's famous "Discours sur les révolutions de la surface du globe et sur les changements qu'elles ont produits dans le règne animal," which appeared in 1822, supplies one of the great landmarks in

¹ [Drafting Committee: T. C. CHAMBERLIN, University of Chicago; U. S. GRANT, Northwestern University; W. H. HOBBS, University of Michigan.—ED.]

the development of the science. The foundations of the relatively modern science of physiographical geology had already been laid in the eighteenth century, through studies by DEMAREST in the valleys of the Auvergne of Central France,— studies which have been ably extended in our own day by DE LA NOÉ, DE MARGERIE, and DE MARTONNE. The brilliant DE BEAUMONT, in collaboration with DUFRENOY, gave a great impetus to geological mapping, at the time in its infancy, by the preparation of the geological map of France begun in 1825.

Earthquake study necessarily began with the collection of facts connected with the great earthquakes of the past. These data, as assembled by Alexis PERREY of Dijon between the years 1841 and 1874, constitute a great reservoir from which all later investigations have drawn their supplies. Today the greatest systematizer in seismology and its leading authority is a Frenchman, Count DE MONTESSUS DE BALLORE. Within the field of oceanography, studies of the most fundamental character dealing with the deposits upon the sea bottom have been carried out by THOULET. In the field of structural geology, it is today generally recognized that the key to the solution of that most complex problem, the structure of the Alps, was supplied by BERTRAND, upon the basis of studies made in the north of France. His other investigations covered a very wide field and were of prime importance. Experiments to reproduce rock structures in the laboratory have had their origin and development very largely in France; the leading part (if we except the most recent work by refined methods) having been taken by DAUBRÉE. A reservoir of data upon existing glaciers is the "Matériaux pour l'étude des glaciers," by DOLLFUS-AUSSET, which appeared in thirteen volumes between 1864 and 1870. The most noteworthy of general treatises upon geology, in the

French language, are those of DE LAPPARENT (in five volumes) and of HAUG (in two volumes).

University Studies of Today. For students purposing to pursue geological studies in France, by far the best opportunities are offered in Paris by the University, the Collège de France, and the École Supérieure des Mines, supplemented as they are by the almost unrivaled collection of museums and libraries to be found in the city. Outside Paris, the best opportunities are realized at the provincial universities of Grenoble, Lille, and at Clermont, either because of exceptional strength of the geological staff in the University or because of special facilities for study in the field. Unlike other departments, the laboratory of geologists is out of doors, and opportunities for the investigation of definite problems in the field may well be a determining factor in the choice of the university, provided other conditions are met. At Grenoble exceptional facilities are found for structural, stratigraphical, and palaeontological studies, and for those upon existing glaciers as well. The University of Clermont is situated within a classic region of recent though extinct volcanoes, and offers numerous problems in vulcanology. The University of Lille is at the heart of the great coal mining region of the north of France, and special attention is there given to problems of economic geology, to structural geology, and, because of the preëminence of the head of the department in the field of the crystalline rocks, to pre-Cambrian geology as well.

The attention which for the first time in recent years has been devoted to the geology of the desert areas makes it desirable to draw attention to the unique opportunities offered by the University of Algiers for the study of such conditions. Situated on the borders of the greatest

of all deserts, and connected by railways with different sections of the desert area, a student may work under the guidance of specialists who have already acquired a wide reputation by their studies of arid conditions.

Paris. At the University of Paris the work in geology is in charge of Émile HAUG, whose major investigations have dealt principally with the great problems of sedimentation in connection with areas of denudation. His principal monograph upon this subject is "Les géosynclinaux et les aires continentales, Contributions à l'étude des transgressions et des régressions marines," published in 1900. He has also contributed to the study of the great *nappes* of the Alps and his "Traité de géologie" (the second volume appeared in 1911) is the most modern of geological treatises printed in the French language. Physical geography is in charge of Emmanuel DE MARTONNE, well-known for his studies in the Carpathians and Roumania, and for his "Traité de géographie physique," which was published in 1909 and is the best general treatise upon the subject in any language.

At the Collège de France, the teaching of geology is conducted by Lucien CAYEUX, well-known for his studies upon the microscopical structure of sediments.

At the École Supérieure des Mines, geology is in charge of Pierre TERMIER, who is also the Chief Engineer of Mines and Director of the Service de la Carte Géologique. Outside the special field of mining, TERMIER has acquired distinction from his investigation of the problems of Alpine structure.

Louis DE LAUNAY, well-known for his studies of ground water and ore deposition, is in charge of geology at the École Nationale des Ponts et Chaussées.

At the École des Hautes Études Scientifiques of the Institut Catholique, Jean BOUSSAC, known for his studies of Alpine structure, occupies the chair of geology.



ALFRED LACROIX (1863-)

A number of geologists of distinction, not connected directly with any of the French schools, are resident in Paris and actively engaged in geological studies; these include EM. DE MARGERIE, former president of the Société Géologique, translator of Suess' "Das Antlitz der Erde," and possessing perhaps the widest knowledge of geological literature of any one now living; Alfred LACROIX, professor of Mineralogy at the Muséum d'Histoire Naturelle, and one of the greatest authorities on volcanoes; Stanislas MEUNIER, in charge of geology at the same institution, known particularly for his studies upon meteorites; Charles RABOT, a leading authority upon glaciers and lately president of the International Commission on Glaciers, editor of "La Géographie"; Léon CAREZ, the principal collaborator in the French Geological Service; Commandant O. BARRÉ, an authority on tectonic geology; and General BERTHAUT, author of a two-volume work of great value upon topography in relation to physiography. Some of these (such as LACROIX and MEUNIER) give courses of lectures open to students.

Supplementary to the geological collections in laboratories of the University and other higher institutions of learning, there are the great collections of the Muséum d'Histoire Naturelle, situated in the Jardin des Plantes. Of libraries of special interest to geologists, one of the best is located in this museum, and in addition there are the large geological libraries of the Société Géologique de France and that of the French Academy.

The principal geological periodicals published in Paris are the "Bulletin" and "Mémoires" of the Société Géologique de France, and "Comptes rendus hebdomadaires des séances de l'Académie des Sciences," "Annales des Mines," "Bulletin des Services de la Carte géologique de la France et des Topographies souterraines,"

"Annales de Géographie," "La Géographie," "Annales de l'Institut Océanographique."

The Provinces. As already stated, while undoubtedly the best opportunities for geological study are to be found in Paris, there are often special reasons why the work of a graduate student may best be carried on at one of the universities of the provinces, which offer a wide variety of geological problems in the rocks of their surroundings. Among professors in charge of the work in geology at the provincial universities are the following: *Lille*: Charles BARROIS, a leading authority upon the geology of the pre-Cambrian rocks, and particularly those of Brittany; *Grenoble*: W. KILIAN, an authority upon the stratigraphy and palaeontology of the Cretaceous formation; *Dijon*: Louis COLLOT; *Marseille*: Gaston VASSEUR, whose field of study has been the Tertiary of Western France; *Nancy* (where there is a School of Geological Engineering): René NICKLÈS, an authority upon the geology of Southeastern Spain; *Clermont-Ferrand*: Ph. GLANGEAUD, whose special field has been the volcanic region of Central France; *Lyon*: Charles DEPÉRET, an authority upon Miocene geology, with whom is associated Frédéric ROMAN in the field of agricultural geology; *Bordeaux*: Emmanuel FALLOT; *Toulouse*: Charles JACOB, in the field of Alpine geology and glacial geology; *Caen*: Alexandre BIGOT, an authority upon the crystalline rocks of Brittany; *Poitiers*: Jules WELSCH, who has given much attention to the tectonic geology of Western France; *Rennes*: Jean SEUNES; *Besançon*: Eugène FOURNIER, tectonic geology, hydrology, and speleology; *Montpellier*: A. DELAGE.

At the University of *Algiers*, where such unexcelled facilities are offered for the study of desert geology, there is a strong staff of specialists in this field, and exceptional opportunities are afforded for the study of

Arabic and for the investigation of economic problems connected with the exploitation of deserts. The head of the geological department, and Adjunct Director of the Service de la Carte géologique de l'Algérie, is Émile FICHEUR. He is assisted by Arbel BRIVES, who is a collaborator upon the survey as well as a professor in the geological department. Georges FLAMAND occupies the chair of physical geography of the Sahara, and enjoys a wide reputation for his explorations in the desert. In addition the University of Algiers supports a professor of the geography of Africa in the person of Émile-Félix GAUTIER, deservedly well-known for many important works in this field. Inasmuch as the geology of deserts is a subject likely to occupy an important place in the discussions of geologists in the near future, the advantages of Algiers as a place of study may well be emphasized.

MINERALOGY *and* PETROLOGY¹

In the fields of Mineralogy and Petrology, French scientists have made contributions of inestimable value, and in some parts of these fields they have opened the way and taken a predominant part in the work of detailed investigation as well as exploration.

MINERALOGY

Knowledge of minerals is based upon a study of them in crystal form; the science of crystals was founded and built in France; as truly stated by Mallard: "Crystallography was thus created as a whole by the genius of HAÛY, and his successors have scarcely had to do more than perfect the details of his work. No other branch of human knowledge is, to the same extent, the work of one man." Later, DELAFOSSE and BRAVAIS developed the theory of a mesh or space-lattice of physical units as the structure of crystals — a theory completely established, within the past two years, by means of studies with X-rays. FIZEAU and LE CHATELIER made numerous investigations of the expansion of crystals upon heating, some of which have had an important bearing upon questions of the condition of formation, especially of quartzose rocks.

An excellent method of chemical analysis of silicate minerals was early developed by STE.-CLAIRE-DEVILLE.

¹ [Drafting Committee: A. N. WINCHELL, University of Wisconsin. — Ed.]



AUGUSTE MICHEL-LÉVY (1844-)

MINERALOGY

Spectral analysis of zinc blende from the Pyrenees led BOISBAUDRAN to the discovery of gallium. Radium was discovered by the Curies as a result of careful investigation of pitchblende and other uranium-bearing minerals. FRIEDEL and GRANDJEAN have recently studied the nature of the water in zeolites, and have shown that it can be expelled and reabsorbed or replaced by other liquids or gases without destroying or changing the nature of the crystal structure.

The methods of synthetic mineralogy were developed in France. FOUQUÉ and MICHEL-LÉVY reproduced all the minerals of volcanic rocks, except quartz and orthoclase, by means of crystallization from dry fusion. By the same process, GAUDIN and VERNEUIL produced ruby and sapphire, the manufacture of which has now become an important industry. Fusion in the presence of mineralizers is a method which has yielded important results in the hands of several experimenters, notably DEVILLE, HAUTEFEUILLE, BOURGEOIS, GORGEU, FRÉMY, and EBELMEN. Finally, several minerals have been produced in the presence of water (or water-vapor) heated in a sealed tube, by DAUBRÉE, SARASIN, and FRIEDEL.

The minerals of metalliferous veins and ore deposits are of much practical importance; BEAUMONT was the first to present a complete and rational theory to explain the origin of such deposits; many of the classic experiments of DAUBRÉE were devised to shed light on the same problem. DE LAUNAY has continued this work and prepared scientific descriptions of the ores of the world.

PETROLOGY

Rocks are composed of minerals; therefore a knowledge of minerals is essential to an understanding of rocks, and the science of mineralogy was necessarily developed before that of petrology. In rocks, minerals are usually present in very small crystals; therefore rocks are studied chiefly by microscopic methods. FOUQUÉ and MICHEL-LÉVY introduced in France these methods, which are based on optical properties first deduced by FRESNEL. DES CLOIZEAUX applied the methods to the study of minerals as such, and thus supplied the fundamental data necessary for petrographic work. MICHEL-LÉVY and LACROIX continued the determination of data, developing at the same time additional methods of using optical properties in identifying minerals.

FOUQUÉ and MICHEL-LÉVY proposed a classification of igneous rocks, based on mineral composition and on texture, which is the foundation of the classification now in use in France, and has contributed much to classifications in use in other countries. MICHEL-LÉVY emphasized the importance of mineralizing agents in processes of differentiation as well as in those of contact metamorphism.

LACROIX has shown that contact exomorphism consists not only in physical changes, but also includes chemical transformations due to introduction of material of magmatic origin. He has also described evidence to show that granitic magmas may be changed to diorites, etc., by contact endomorphism. LACROIX has also written a monographic work on the "Mineralogy of France," in which he has emphasized the varying modes of occurrence and of alteration of minerals in order to fix the mode of origin and conditions of stability. In a similar

way he has studied the lavas of Mont Pelée from all points of view, in order to draw general conclusions concerning their origin.

University Studies of Today. *Paris.* At the present time the leading mineralogist and petrologist in France is Alfred LACROIX, who succeeded DES CLOIZEAUX as professor of mineralogy at the Muséum d'Histoire Naturelle in 1893. He has published a five-volume work on "La minéralogie de France," which is a standard treatise on the optical properties and modes of occurrence of minerals; a volume on "Les enclaves des roches volcaniques;" two volumes on volcanic activity at Vesuvius and Mont Pelée; and numerous important studies of minerals, of contact metamorphism, of descriptive petrography, and of rock alteration. He offers courses of lectures on mineralogy; but the student prizes especially the opportunity to study in his laboratories under his inspiring guidance. At the same institution Stanislas MEUNIER holds the chair of geology; he is the author of an important work on "Les méthodes de synthèse en minéralogie." At the University of Paris, Louis GENTIL, who has described petrographically certain districts in Algeria, offers excellent courses in general petrography.

At the Collège de France, the eminent crystallographer, F. WALLERANT, is in charge of the work in mineralogy; he has published important contributions to crystal theory. Here, also, is L. CAYEUX, who is an authority in the relatively neglected field of the petrography of sedimentary rocks; recently he has extended his studies to include all types of iron ores.

At the École des Mines is the well known mineralogist, TERMIER, who has been a close student of individual minerals and of the crystalline schists of the Alps. L. DE LAUNAY offers courses at this school and also at the

École des Ponts et Chaussées; he has published several important volumes treating of the origin of the minerals in ore deposits.

LE CHATELIER, URBAIN, and MATIGNON are primarily chemists, but they have made various contributions to mineralogy, especially from the chemical point of view. LE CHATELIER and URBAIN are at the University of Paris; MATIGNON is at the Collège de France.

Outside of Paris. One of the most prominent mineralogists is G. FRIEDEL at the École des Mines of Saint Étienne at Lyon, who has done notable experimental work with the zeolites, and has published works on crystallography. At the University of Montpellier, mineralogy is in charge of CURIE, who studied the eruptive rocks of Algeria, and has been associated in some work on piezo-electricity with the discoverer of radium. At the University of Nancy, THOULET has made studies of the physical and chemical properties of microscopic minerals. Joseph CARALP is professor of mineralogy at the University of Toulouse. At Nancy, the Institute of Geology trains mining engineers.

From a petrographic point of view the University of Lille is the most important institution outside of Paris. It is here that BARROIS is professor of geology, and OFFRET professor of mineralogy. BARROIS has described in detail the contact metamorphism of sandstones, shales, and limestones, and OFFRET has made petrographic studies of certain rocks and minerals.



ADOLPHE BRONGNIART (1801-1876)

GEOLOGY: PALAEOLOGY

PALAEONTOLOGY¹

In the history of palaeontology there is no nation so rich in memories as France, none held in so great regard by students — in almost reverential regard by the student of extinct vertebrates especially, for there his science was born a century ago, and CUVIER was its father. The world's greatest scientist of his time, and one of the greatest naturalists of all time, CUVIER first taught the real meaning of fossils, and especially vertebrate fossils. With him began a new epoch in all palaeontology, one based upon zoölogy; and fossils ceased to be mere curiosities in the rocks, or the mere tools of geology.

The great Sir Richard OWEN of England was his student, but all felt the effects of CUVIER's brilliant mind. DE BLAINVILLE, DESLONGCHAMPS, FILHOL, GERVAIS, MILNE-EDWARDS, SAUVAGE, LARTET, and GAUDRY are among the many Frenchmen of the nineteenth century who won enduring fame wherever vertebrate palaeontology is studied; and among those of the present day, DEPÉRET, BOULE, PRIEM, LERICHE, and THEVENIN, are some of those whose reputations have extended worldwide.

Nor is invertebrate palaeontology any less indebted to France of the nineteenth, and even the eighteenth centuries. Beginning with the famous BUFFON, who for more than a century was a delight to children everywhere, the most noted of all, perhaps, though not exclusively a palaeontologist, was LAMARCK, who found in

¹ [Drafting Committee: S. W. WILLISTON, University of Chicago.—ED.]

the "animaux sans vertèbres," both living and fossil, the foundations for his famous theories of development, theories which are even more vigorously discussed today than when they were first offered. Suffice it to mention the names of only a few that every student of the science knows: BARRANDE, BRONGNIART, DESHAYES, A. MILNE-EDWARDS, POMEL, LEMOINE, and especially d'ORBIGNY. And in palaeobotany the indebtedness of the world is equally great, perhaps greater; for Adolphe BRONGNIART has been rightly called the father of the science. And what naturalist has not heard of SAPORTA? And there have been and are many others.

One is safe in saying, on a survey of the great names of palaeontology, that no nation of the nineteenth century did as much to advance the science of palaeontology; none has a greater list of eminent scientific names in palaeontology.

Instruction. What has France to offer the student of palaeontology today? First of all, a rich and inspiring memory of the great scientific men of the past. And, secondly, the rich collections that have served these men in their investigations, and the great museums and able teachers of today.

These collections are scattered more or less throughout the institutions of France. But (it goes without saying) the most extensive and important of all are in Paris, and especially in the great Natural History Museum, where American scientists have spent very pleasurable and fruitful days. One of the divisions of its vast collections is formed by palaeontology ("Galerie d'anatomie comparée, d'anthropologie, et de paléontologie," founded by Cuvier). The library contains 250,000 volumes, and, besides the lecture courses, there are monthly meetings of the scholars pursuing research there. At the École

Nationale Supérieure des Mines also, there is a valuable and noted collection in palaeontology. The Universities of Caen, Grenoble, and Lille, also have special collections in palaeontology.

One of the few periodicals anywhere devoted to palaeontology is the *Annales de Paléontologie*, published for the past ten years at Paris under the direction of BOULE.

Palaeontology cannot be pursued as an isolated science. Fossils are merely animals and plants that have been dead longer than others, as Huxley once said, and must be studied in connection with living organisms and with geology. The student should therefore seek those universities where geology, and especially historical geology, is given much attention, and where also botany and zoölogy in all their branches are well represented. Perhaps there is no university in France, and few if any in all Europe, where all these requirements are better met than in Paris. Of the eighteen chairs in the Natural Sciences at the Museum of Natural History, one is assigned to Palaeontology; its present incumbent is BOULE, well known for his work in anthropology and palaeontology, more especially vertebrate palaeontology. In the University, under the Faculty of Sciences, a course in palaeontology is given by THEVENIN, author of notable works in both invertebrate and vertebrate palaeontology, but especially the latter.

There are other universities in France where palaeontology is taught as a distinct science, and where the student may find better conditions for special studies; in the final work it is often the teacher who counts more than anything else. Courses in palaeontology are given at Caen by BIGOT, at Grenoble by KILIAN, and at Lille by BERTRAND. But there is no place, we believe, where he will find greater encouragement in his early studies than Paris.

From there he will easily find opportunity to inspect the institutions and museums of other cities, and to visit the numerous localities in France where the deposits of prehistoric times are so especially abundant and celebrated. In vertebrate palaeontology many famous fossils have been described from the Carboniferous and Lower Permian rocks of Autun, the Jurassic and Cretaceous of northern France, to the Eocene of Paris, Rheims, Aix, Soissons, the famous Oligocene of Quercy, the Miocene of the Dept. Allier, St.-Gérard-le-Puy, Soissons, and elsewhere. One need not add that the Paris Basin, of early Cenozoic age, was first made famous by Cuvier. In Anthropology no name is more eminent perhaps than that of BOUCHER DE PERTHES, who first really demonstrated the existence of fossil man. And the names of QUATREFAGES, LARTET, SERRES, and TOPINARD, are but little less so. But at this point we enter a field more fully described already in the Chapter on ANTHROPOLOGY.

HISTORY

HISTORY¹

American students do not need to be reminded at length of the nature and extent of the contribution of France to the modern study of history. To the age of erudition France contributed the labors of the great Benedictines and of pre-eminent individuals of the type of DU CANGE, CUJAS, SCALIGER, and CASAUBON. In the eighteenth century it took the lead in the application of general ideas to history in the works of MONTESQUIEU and VOLTAIRE. A century later it had its brilliant group of literary historians, represented by RENAN, TAINÉ, and MICHELET. It founded Egyptology, and produced the greatest of recent mediaevalists in Léopold DELISLE. It has taken a notable part in the development of the sciences auxiliary to history, in the publication of great collections of sources, and in the maintenance of schools and the encouragement of exploration in the remoter portions of the earth. At the same time, amid the vast accumulations of historical detail, French historians have not lost their sense of proportion or their interest in the larger aspects of history; without sacrificing thoroughness of research or finish of workmanship, they have also preserved qualities of clearness, order, and literary skill which are characteristically French.

Fields of Instruction. French universities offer a wide range of instruction in the history of every period

¹[Drafting Committee: C. H. HASKINS, Harvard University; J. A. JAMES, Northwestern University; A. C. McLAUGHLIN, University of Chicago; D. C. MUNRO, Princeton University; J. T. SHOTWELL, Columbia University.— Ed.]

and of most parts of the world, as well as in a large number of related fields. History is there conceived in a broad and liberal spirit, with no exaggerated emphasis upon political details or special "interpretations." Less attention than is usually the case in the United States is given to economics and political science and to their relations to history, the instruction in these subjects being confined for the most part to the faculties of law. Legal history, however, receives more emphasis in France than with us, and law professors (such as FOURNIER, GIRARD, CAILLEMER, and others) have much to offer to students of history. Certain other aspects of history receive their due more fully in French than in American universities, or, in some cases, than anywhere else. This is notably true of geography, which in the French programs is brought into a close and at times even artificial connection with history; of archaeology and the history of art, studied in the midst of a great wealth of illustrative material at Paris; and of the history of religions, represented at the Collège de France by LOISY, and at the École des Hautes Études by a faculty of seventeen, unequalled in number or quality at any other center of learning in the world. Church history in the state universities is taught only as a part of general history and the history of religions; but courses of the more conventional type are given in the private faculties of theology, both Catholic and Protestant.

In Ancient History, Paris has JULLIAN, whose "Histoire de la Gaule" is a synthesis of a vast number of special studies in the field of history, philology, and archaeology; BOUCHÉ-LECLERC, whose manual of Roman institutions has served a generation of scholars; BLOCH, GLOTZ (on Greek law), GRÉBAUT; GSELL, the historian of Domitian and of Northern Africa; in archaeology and epigraphy, BABELON, COLLIGNON, FOUCART,



ERNEST LAVISSE (1842-)

HISTORY

HAUSSOULLIER, HÉRON DE VILLEFOSSE, HOLLEAUX, and CAGNAT; and a number of scholars in the fields of Semitic history, ancient religion, and early Christianity. In the provincial universities, ancient history is represented by RADET at Bordeaux, BESNIER at Caen, HOMO at Lyon, JOUGUET at Lille, LAURENT at Nancy, CLERC at Aix, and LÉCRIVAIN at Toulouse.

In the History of the Middle Ages, the French universities are excellently equipped. At Paris one may study under BÉMONT, editor of the "Revue Historique" and an admirable teacher, who has long been one of the world's leaders in the study of English history; DIEHL, the eminent writer on Byzantine history and Byzantine art; Ferdinand LOT, whose studies have remade a considerable portion of French history in the period of the Carolingians and their immediate successors; POUPARDIN and THÉVENIN on the early Middle Ages; PFISTER and JORDAN on the later period; and FLACH on the history of institutions. All the courses of the École des Chartes are of interest to the mediaevalist, notably the work of its learned and helpful director, Maurice PROU. On the side of art and archaeology, the supreme achievements of mediaeval France can be studied under ENLART, author of the indispensable "Manuel d'archéologie française," and MÂLE, the authority on mediaeval sculpture. The mediaevalists of the provincial universities include HALPHEN and FLICHE at Bordeaux; PRENTOUT at Caen; GUIRAUD at Besançon; STOUFF at Dijon; BRÉHIER at Clermont; GAY at Lille; KLEINCLAUSZ at Lyon; PARISOT at Nancy; SÉE at Rennes; CALMETTE and GALABERT at Toulouse.

In Modern History, perhaps the most distinguished French professor in active service (LAVISSE having now retired) is AULARD, who through his own work and that of his disciples has remade the history of the French

Revolution. Others of note at Paris are BOURGEOIS, the historian of diplomacy, DENIS for the nineteenth century, and SEIGNOBOS for historical method and general topics. More special courses are offered by BERNARD, BLOCH, CULTRU, DEBIDOUR, REVON, and REUSS, and work in diplomatic history is given by BOURGEOIS and others at the École des Sciences Politiques. In provincial universities there should be mentioned HAUSER and FEBVRE at Dijon; BOISSONNADE and CARRÉ at Poitiers; DESDEVISES DU DÉZERT at Clermont; BLANCHARD at Grenoble; GAFFAREL at Aix; MATHIEZ at Besançon; WEILL at Caen; MARIÉJOL and WADDINGTON at Lyon; SAGNAC and ST. LÉGER at Lille; PARISOT at Nancy; GACHON and BOURRILLY at Montpellier; DUMAS at Toulouse; and COURTEAULT at Bordeaux.

Institutions. The natural center for historical students is the Faculty of Letters at Paris, generally known as the Sorbonne, with which the courses of the École Normale (formerly reserved exclusively for its own students) are now merged. Historical instruction is given by formal lectures (open to the public, and serving as excellent examples of the art of presentation); by private courses and discussions; and by exercises for the training of future teachers.

To many, the opportunities of the Sorbonne, with its nineteen lecturers on history, will appear sufficient. American students, however, accustomed to the comparative simplicity and centralization of university organization in the United States, need to have their attention directed to the great number of special schools and institutes outside of the central faculties of letters, science, law, and medicine. Those most closely connected with the study of history are the Collège de France, which maintains important courses of lectures

in convenient proximity to the Sorbonne; the École Coloniale; the École d'Anthropologie; the École du Louvre; the Institut Catholique de Paris; the École Pratique des Hautes Études; the École des Chartes; and the École Libre des Sciences Politiques. For the majority of students the three last-named are the most important.

The historical sections of the École des Hautes Études, now housed in the buildings of the Sorbonne, offer advanced instruction in the form of a wide variety of seminary and special courses. The work is open to all, without distinction of age, degree, or nationality, who are willing to take active part in the exercises and can satisfy the instructor of their competence. Beyond this there are no conditions as to admission and no restrictions on the number and choice of courses. There is no fixed curriculum; those who have been in attendance three years and present a satisfactory thesis receive a diploma but no degree. The high quality of the theses is seen in the imposing "Bibliothèque de l'École des Hautes Études," a series of historical and philological monographs which comprises more than two hundred volumes.

The École des Chartes is a special school for the training of archivists and librarians for the public service. It embraces the whole period of French history down to 1789, with special emphasis upon the Middle Ages. It offers instruction in palaeography, diplomatics, archaeology, Romance philology, history of French law and institutions, sources of French history, and organization of libraries and archives. The curriculum covers three years, and the number of regular pupils is limited, but qualified outsiders are admitted to the courses. The school has a long and honorable tradition in the history of French scholarship and has served as a

model for similar institutions in Vienna and Florence. Its alumni publish an important historical journal, the "Bibliothèque de l'École des Chartes."

The École Libre des Sciences Politiques is a private institution, occupying quarters in the Rue St. Guillaume, about fifteen minutes' walk from the Sorbonne. It was established in 1871, primarily for the purpose of fitting young men for the higher branches of the civil service, and its organization and character are determined by the examinations of the various government departments for which it prepares. Economics and political science naturally predominate, but attention is given to recent history, especially on the diplomatic and constitutional sides. The standing of the school is indicated by the names of its successive directors, BOUTMY, Anatole LEROY-BEAULIEU, and D'EICHTHAL, and by its publication, now known as the "Revue des Sciences Politiques."

Libraries, Archives, and Museums. The historical resources of Paris are greatly increased by the Bibliothèque Nationale and the various archives and museums. The Bibliothèque Nationale has the largest body of printed books in the world, and unrivalled collections of manuscripts and maps. Of the various depositories of unpublished documents, the most important for the American student are the Archives Nationales, under the enlightened direction of Charles V. LANGLOIS, the Archives des Affaires Étrangères, and the Archives de la Marine. The Carnegie Institution of Washington has nearly completed an elaborate guide to the materials for American history in these and other French collections. For daily use the library of the Sorbonne is well equipped and well administered, with the library of Ste.-Geneviève close at hand; and the special schools

also have useful libraries of reference. Paris is especially rich in museums of historical interest, notably the unique riches of the Louvre, the Musée de Cluny, the museum of Comparative Sculpture at the Trocadéro, and the Musée Carnavalet, where the history of Paris from the earliest times is unrolled before the visitor. Finally, Paris itself is full of history, from the baths of the Emperor Julian to the memorials of the present war, and constitutes an unfailing source of inspiration to the intelligent student.

Provincial Universities. The provincial universities naturally offer fewer opportunities than Paris, but their faculties comprise eminent scholars and teachers, competent in many cases to direct work in important historical fields outside of the history of France. Several of these universities have special chairs of local or regional history, and they all afford an excellent introduction to French life and thought.

On the whole it is the advanced student of history, and not the beginner, who will derive most advantage from a sojourn in France, and especially in Paris. The immature youth, who has not yet secured a good grasp of the essential facts of history, who has not received some substantial training in investigation, and has not some clear ideas concerning the nature of historical study and the reasons why he is pursuing it—a man of this sort is ill prepared to work wisely amid the multiplicity of special courses and the manifold distractions of the French capital. Thanks to the rapid development of American universities in the past thirty years, it is no longer necessary to cross the Atlantic in order to begin one's historical apprenticeship, or even, in some lines, in order satisfactorily to complete it; and there can be

no question that the proportion of those who pursue their entire graduate course abroad has much decreased. Their place is being taken by a growing number of mature students—professors on leave, traveling fellows, newly-made doctors, and others—who desire to continue work already well begun here. During their residence abroad these men will no doubt increase their stock of historical information and learn valuable lessons in historical method. But their greatest profit will come from access to great collections of historical material, from the stimulus of contact with new teachers and new ideas, and from first-hand knowledge of the monuments of the European past and the life of the European present. To such students France offers a warm welcome and a wide opportunity.

LAW



JEAN DOMAT (1625-1696)

LAW

LAW¹

The learned and systematic study of law, though never entirely broken off in the Middle Ages, begins virtually for the modern world with the revival of the study of Roman Law under Irnerius at the University of Bologna, in the second half of the 1000s A. D. From Italy germinated the subsequent growth of legal science in other countries. After four centuries, when the schools of the Glossators and the Commentators had successively risen and fallen in that country, the primacy in legal studies passed to France, which gave to the brilliant Italian Humanist, ALCIAT, a home at Avignon, in 1518, and afterwards at Bourges. "*Jurisprudentia romana*," said the Englishman Duck in 1650, "*si apud alias gentes extincta esset, apud solos Gallos reperiri posset.*" The "*mos Gallicus*" had become the fashion in the juristic world; and for two centuries France held this European primacy, under CUJAS, DONEAU, BAUDOUIN, DUMOULIN, BRISSON, DOUAREN, GODEFROI, and HOTMAN. By that time legal science had become more nationalized. Every country of Western Europe was developing its jurists.

In the seventeenth and the eighteenth centuries France's great task was the complex one of consolidating and nationalizing its own composite body of law. The labors of DOMAT, D'AGUESSEAU, LAMOIGNON, COLBERT, POTHIER, and others of that period, and the commercial

¹ [Drafting Committee: J. H. BEALE, Harvard University; L. B. REGISTER, University of Pennsylvania; MUNROE SMITH, Columbia University; J. H. WIGMORE, Northwestern University.— Ed.]

and procedural legislation under Louis XIV, prepared the way for the grand results of the Napoleonic codification; and the political philosophies of MONTESQUIEU and ROUSSEAU initiated a world-influence which has not yet ceased.

The promulgation of the Napoleonic Codes (Civil, Penal, Commercial, Criminal, Procedural) between 1804 and 1810, was the greatest legal fact of the first half of the nineteenth century. These Codes represented the legal side of the vast social and political revolution of ideas in the Western world; and they belted the globe with their influence. Not only many European countries, but almost all the Latin-American States, used the Codes in framing their own legislation. In the stimulus given by them indirectly in many departments of law, the Napoleonic Codes continued to be dominant legal factors until the last quarter of the nineteenth century. The method of textual commentary, based on the fixed categories of the Codes, absorbed most of the energies of French jurists during the first three quarters of the century; and these Commentaries are still in common use even in foreign States (like Latin America, Louisiana, and Quebec) which had based their legislation on the French Code.

But changed social and political conditions raised new problems and shifted the emphasis laid on older and persistent needs. The spread of the Historical School (championed from Germany by SAVIGNY in the second quarter of the century) and the interest in historical and comparative studies created by Sir Henry MAINE, FUSTEL DE COULANGES, and Albert POST; the expanding claims of philology, archaeology, psychology, anthropology, and other sciences; the development of social philosophies in France and elsewhere; the growth of commercial, industrial, and maritime interests; and the increased attention

paid to international law and administrative law — all these influences helped to open new fields of investigation outside of the Civil Code.

With this shifting of emphasis, the last quarter of the century began to see active attention paid to the other and now dominant fields of legal interest. During the last forty or fifty years, and increasingly so in that period, every department of the world's legal thought has been represented in France by master minds in the university chairs and by treatises embodying the most approved methods and original results in legal research.

In Latin America and in some European countries (such as Belgium, Greece, and Roumania), the study of the French Codes is the study of their source-law. But for American students, no country's law, except that of England, presents such a direct reason for pursuing its advanced study abroad. Technical law is essentially local; its materials are largely the legislation and practice of each country. In this respect, legal science differs from (let us say) mathematics or zoölogy.

Nevertheless, law has its universal aspects, and they are growing with each decade. Among the important topics which thus have an extra-national value and interest for the legal scholar are *Roman Law, Comparative Law and Legislation, Legal History, Philosophy of Law, Constitutional and Administrative Law, International Law, Criminology and Criminal Law*.

In all of these fields, France offers interesting and valuable opportunities for university study under the most accomplished masters.

But before noting the instruction offered in these particular subjects, a few words may be offered regarding some other features of French law interesting to the American lawyer.

One of these is the splendid professional tradition dominant in French courts of justice.¹ The position of the advocate, in courage, independence, professional privilege, and fidelity to his client, is comparable only to that of our own professional predecessors in England, Ireland, Scotland, and our own country. The judges, having come up to the Bench from the Bar, as in England and America, have shared this spirit of professional independence. No other country is as notable as France in this common trait. Four times in French legal history has the entire Bar resigned its functions, and left the courts without lawyers, rather than submit to the arbitrary dictation of princes and politicians. The glorious incidents that are treasured in our professional annals find their parallels in all periods of the French Bar. If we are proud for this reason of the names of Coke, of Mansfield, of Erskine, of Brougham, of Denman, of Otis, of Hamilton, of Henry, of Choate, France too has its traditions,— of Talon, exiled by the crafty Cardinal Mazarin for resisting an unjust decree; of Servin, who fell dead while uttering a similar protest in the presence of Cardinal Richelieu and Louis XIII; of Élie de Beaumont, whose memoir against the unjust execution of Calas was read throughout Europe and led to Voltaire's famous diatribe against the criminal law; of Bellart, who defended many of the victims of the Terror, before the most bloodthirsty Tribunal the world has ever seen; of Malesherbes, who dared to act as counsel for the unfortunate Louis XVI before the Convention, and himself met his client's fate at the guillotine two years later; of Bonnet, who defied Napoleon in defending General Moreau; of Berryer, who defended the

¹ As far back as Juvenal's day, Gaul was famous throughout the Empire for its lawyers: "*Gallia causicos docuit facunda Britannos*" (Satire xv, l. 111); "*Accipiat te Gallia vel potius nutricula causicorum Africa, si placuit mercedem imponere linguae*" (id. vii, l. 147).



JEAN BRISSAUD (1854-1904)

LAW

future Napoleon III on a charge of treason against Louis Philippe; and of Captain Dreyfus' courageous counsel, L'abori, whose recent death the two Republics lament. These traditions, continuous over five centuries, are not without meaning to the American student of law. They impress themselves on the whole system of law and justice. A country which possesses and prizes such traditions of the Bar is one which offers the Anglo-American student an inspiration congenial and fruitful to his professional studies.

Another feature worth recalling — intangible, perhaps, but real — is the rich variety of legal reminiscences that meet the visitor at every spot in France, and help to arouse interest in the history and romance of the law. Every epoch of law here purveys for him something of its sentiment. In Paris, he may linger before the veritable pillar of Hammurabi's Code, four thousand years old. In the South and in the museums and libraries of Paris he may trace, in manuscripts and monuments, the vast influx, in a later epoch, of the great system of Roman law, as it spread over Celtic Gaul. In the next great epoch, the revival of Roman law a thousand years later, he finds everywhere, south of the Loire, the reminiscences of the world-jurists of the day,— at Toulouse, where Coras lectured to 4000 hearers; at Avignon and at Valence, where Alciat brought the new law-learning from Italy four centuries ago; and at Bourges, where Cujas taught, at whose renowned name (Hallam tells us) the law students of Germany were accustomed to take off their hats; and where also the great Hotman lectured, who once said that our Littleton's classical treatise on "Tenures" was "incondite, absurde, et inconcinne scriptum," and was thereupon pilloried by our patriotic, irascible Coke ("Stultum est absurdas opiniones refellere.") In Normandy, at Rouen, he may enter the superb Court House, the oldest building in Europe (now

that Westminster Hall is deserted by the judges) where justice has been dispensed continually since its erection; and at Caen, the home of William the Conqueror, he may see the manuscript of the Custom of Normandy, of which English law for a time was a branch only. In Brittany, at Tréguier, he may pay homage at the shrine of Yves, the patron saint of our profession, the only lawyer ever canonized (*"Advocatus sed non latro, res miranda populo"*); and at Rennes, for modern flavor, he may visit the court-room where the second trial of Captain Dreyfus took place, the world's most famous trial for half a century past. At Bordeaux, he may see the home and the statue of Montesquieu, whose philosophy of law and government is still embodied in the American Constitution; and at Toulouse, he finds, Sir Thomas Smith composed his *"Commonwealth of England,"* by two centuries a precursor of Sir William Blackstone's *"Commentaries."* At St. Omer, where the great College of the Jesuits once flourished, he comes upon the traces of our famous Irish advocate and cross-examiner, Daniel O'Connell, who was there educated. At Bourges, Scotch lawyers once studied. At Clermont, he finds the birthplace of Domat, whose works are still cited by our Supreme Court of Louisiana.—And so he may continue, marking off in his pilgrimage at every spot some significant event or personage that has contributed to the world's movement in law.

This "sentimental journey," it is true, may not directly assist his technical proficiency; and it may not appeal to all temperaments. But for the American student abroad one of the greatest gains must always be the sense of union with the notable events and persons of the past in his chosen field. And the profession of the law in America needs to become less insular and less narrow in its outlook on the present, and more aware of

the continuity of all legal traditions and knowledge. The future American jurist who spends a time in France may be assured of finding there the most varied interest, and the most lasting inspiration for the broadening and deepening of his professional studies.

Instruction in the Universities. It remains to summarize the specific resources for university instruction in the chief subjects of general interest.

Roman Law. The great tradition of ORTOLAN's name, whose treatise first appeared in 1827 ("Législation romaine; explication historique des Instituts de Justinien"; 12th ed., 3 vols., 1883), is worthily maintained by a group of distinguished scholars, representing every field of Roman law and the most modern methods of archaeological and philological research. Among them may be named these: P. F. GIRARD (Paris), the veteran master, one of the two or three living scholars who receive the world's homage in this field; his "Textes de droit romain" and "Manuel élémentaire de droit romain" are handbooks in many countries; APPLETON (Lyon), whose principal work is "La propriété préto-rienne" (2 vols., 1889); CUQ (Paris), author of "Les institutions juridiques des Romains" (2 vols., 1902-1907), who lectures on Roman legal history; JOBBÉ-DUVAL (Paris), author of "Études sur l'histoire de la procédure chez les Romains" (1896), and of essays on the history of Continental procedure, who lectures on the Digest (or Pandects, as the current French usage has it); AUDIBERT (Paris), also a specialist in the history of Roman law; MEYNIAL (Paris), professor of the history of Roman and French law; MAY (Paris), whose "Éléments de droit romain" has gone into its tenth edition; HUVELIN (Lyon), whose "Le Furtum" (vol. I, 1914),

represents a lifetime's labors and ranges over the entire area of primitive Roman ideas; COLLINET (Lille), author of "Étude historique sur le droit de Justinien" (vol. I, 1912); THOMAS (Toulouse), whose specialty is the papyrology of Roman Law in Egypt; DESSERTAUX (Dijon), author of numerous works on technical Roman law; MONNIER (Bordeaux), whose specialty is Byzantine Roman Law; FLACH (Paris), whose vast authority in the historical field makes him a specialist in medieval Roman law.

Legal History. The position of France as the Western haven of mingling racial streams of immigration and conquest — Celtic, Romanic, Germanic — has always been a stimulus to the decipherer of historical riddles of law. And its rich collection of records of customary law has served as fertile training material for historical scholars. The notable names of the first three-quarters of the nineteenth century — PARDESSUS, GINOULHIAC, LABOULAYE, LAFERRIÈRE, GARSONNET, GIRAUD, BEUGNOT — occupied themselves chiefly with the critical editing of these sources (on which, indeed, the greater number of modern scholars are still laboring). Then came a period of masters who devoted themselves to works of larger scope; and this period now continues. The earlier ones (but just passed off the stage) include FUSTEL DE COULANGES (a contemporary of Sir Henry Maine's, and almost as influential in his ideas); GLASSON (whose volumes cover the legal history not only of France but also of England); TARDIF (who specially worked in Norman law); ESMEIN (a versatile master in many fields); BEAUNE and VIOLLET (whose works have each a special merit); and BRISSAUD, who was perhaps the greatest modern historian of law in any country; certainly Maitland, Brunner, and Schupfer (of Rome) can alone be mentioned with him.

Of the older generation of masters now pursuing their labors these may be mentioned in passing: FOURNIER (Paris), whose specialty is the history of mediaeval Roman and ecclesiastical law; FLACH (Paris), whose "Origines de l'ancienne France" marks his special interest in the history of public law; his chair is that of the Comparative History of Legal Systems; JOBBÉ-DUVAL (Paris), one of whose specialties is mediaeval procedure.

Among those masters who may be spoken of as juniors, but in age only, not in achievement, are these: HUVELIN (Lyon), whose History of Commercial Law (now in preparation) will take the place of Goldschmidt's in the coming generation; LAMBERT (Lyon), whose interests extend into Comparative Legal History; CAILLEMER (Grenoble), whose "History of Executors" has thrown much light on English law; DECLAREUIL (Toulouse), whose special field has been the Frankish law; GÉNESTAL (Paris), whose principal work is in the history of Canon laws; CHÉNON, MEYNIAL, and LEFÈVRE (Paris), who represent general French legal history; the "Histoire du droit matrimonial français" (4 vols., 1908-14), by the last-named scholar, is still unfinished; COLLINET (Lille), who besides holding the chair of French Legal History is an authority in Roman Law.

The Société d'Histoire du Droit et des Institutions cultivates specially this field. In the chapter on History in this book will be found a more particular account of the resources available for research in History generally.

Comparative Legal History. This subject (as distinguished from Comparative Contemporary Legislation) naturally is linked with that of Roman and Western European legal history, and several of the incumbents of chairs above mentioned deal with aspects of it in their treatises and courses. But, in another relation, it merges

into the History of Universal Legal Ideas, or Evolution of Law; and the cultivation of this branch of learning has gone on apace in France, since the classic days of Sir Henry MAINE and FUSTEL DE COULANGES, whose works, appearing about the same time in the '60s, have passed into numerous editions in many languages and have set going a world-wide wave of ideas. It may be said that KOHLER, in Germany, and DARESTE (recently deceased) in France, have been the two chief inspirers of research in this field in the past generation. But the social, economic, and anthropological fields are here so intimately involved that much valuable work has been done by scholars who cannot strictly be classed as jurists. In France, Paul GIDE, LAVELÈYE, LETOURNEAU, TARDE, ARBOIS DE JOUBAINVILLE, represent the general literature of the past generation on this subject. The brothers REVILLOUT, with their prolific works on Egyptian and Babylonian law, gave new directions to the zest for general ideas in this field. DE LA GRASSERIE (recently deceased) emphasized its sociologic aspects.

For living teachers, no one stands out as specially devoted to it; the several aspects must be sought among the specialists in history, philology, ethnology, sociology, archaeology, and philosophy. For example, GLOTZ (Paris), in Greek law; DURKHEIM (Paris), in primitive religions; HAUSSOULIER (Paris), in epigraphy; SCHEIL (Paris), in Assyriology, are powerfully stimulating the comparative treatment of legal evolution in its border relations with philology, religion, economics, and sociology. There is also a special École d'Anthropologie at Paris.

Comparative Contemporary Law. This field, which sometimes merges into the former, is richly represented in French learning. The Société de Législation comparée, founded in 1870 (the oldest of its kind) publishes

an "Annuaire de législation comparée," as well as a "Bulletin"; and the Ministry of Justice has long had a Bureau, the Comité de législation étrangère, which publishes translations of the important foreign codes. A number of chairs or courses are especially entitled "de législation comparée," or "de droit comparé," such as those of CAPITANT (Paris), CHAVEGRIN (Paris), MASSIGLI (Paris), FLACH (Paris), LAMBERT (Lyon), LYON-CAEN and THALLER (Paris), with more or less specializing in the several departments of civil, criminal, commercial, or constitutional law.

Systems of Colonial Legislation naturally receive attention in nearly every faculty of law. Officials of the colonial service are contributing valuable publications of materials on Mohammedan, Chinese, and African law and custom. In the École Coloniale (Paris) are given courses in general colonial law, in the law of China, Indo-China, Algeria, Tunis, occidental and equatorial Africa, and in Mohammedan law. Industrial Legislation has now become a subject of comparative study. Beside the courses under the Faculties of Law by JAY and PERCEROU (Paris), LESCURE (Bordeaux), PIC (Lyon), BÉRENGER (Marseille), and others, instruction is given in this subject at the Conservatoire National des Arts et Métiers, at the École Centrale des Arts et Manufactures, and at the École de Législation Professionnelle. The Association Internationale pour la protection légale des Travailleurs has its headquarters at Paris, and is an active stimulator of research.

Legislative Methods are coming into the field of comparative law. The necessity for re-casting or replacing the century-old Civil Code has stimulated a number of activities, particularly the Société d'Études Législatives, a unique organization, which studies the Code topically, and through separate Committees prepares and discusses

drafts of proposed new chapters framed in the light of contemporary needs and comparative law. The Académie des Sciences Morales et Politiques has a section for Legislation, which conducts lectures and debates. At Toulouse, the Académie de Législation conducts debates and publishes a *Recueil*. And a number of prize competitions for essays are devoted especially to the subject of contemporary legislation.

The rich resources available for legal research in libraries and archives are fully set forth in the chapter on Political Science in this book, and need not be here repeated.

Philosophy of Law and Jurisprudence. Neither the analytic jurisprudence of Austin, made dominant by him for Anglo-America, nor the metaphysical philosophy of law, pursued in Germany since Kant's time, obtained much footing with French jurists during the 1800s. Nor have the universities of France, any more than those of America, included courses on jurisprudence and philosophy of law as a formal part of their prescribed curriculum. The philosophy of law was left to the philosophers,—Comte, Fourier, Proudhon, Fouillée.

But the last twenty-five years have seen a remarkable growth in France of a vigorous interest in both of these allied branches of study,—chiefly inspired and led (so far as personal influence was responsible) by the eminent idealist philosopher FOUILLÉE, and by the great jurist SALEILLES, whose recent death is lamented in many departments of legal science. A host of younger men now cultivate this field with such originality and success that, for the philosophy of law of the coming generation, the French systems are vital for every American student,—the more so as they are the product of a democratic nation whose traditions, experiences, and ideals are germane to our own.

Among the principal contributors now occupying university chairs may be mentioned: BEUDANT (Grenoble), author of "Le droit individuel et l'État" (1891); CHARMONT (Montpellier), author of "Le droit et l'esprit démocratique," and "La renaissance du droit naturel"; CAPITANT (Paris) and PLANIOL (Paris), whose books, entitled "Elementary Treatise on Civil Law," represent most nearly what we are accustomed to term "Analytical Jurisprudence"; DUGUIT (Bordeaux), whose masterly works "Le droit social, le droit individuel, et la transformation de l'État" and "Les transformations générales du droit civil" have recently been published (in part) in American translations, together with representative parts of CHARMONT's and DEMOGUE's works; GÉNY (Nancy), whose "Méthode d'interprétation et sources en droit privé positif" (1899) has stirred European philosophic legal thought as no other single book has done since von Ihering's "Der Zweck im Recht"; DEMOGUE (Lille), author of "Notions fondamentales de droit privé" (1911), which has instantly been recognized as the work of a master; HAURIOU (Toulouse), author of "Le mouvement social," and of "Principes du droit public". (1909), one of the most original treatises of the time; LAMBERT (Lyon), whose work bridges the gap between comparative law and general jurisprudence; LARNAUDE (Paris; dean of the Faculty of Law), whose progressive influence in this field is comparable to that of the lamented SALEILLES.

Nor is the expanding power of French thought in this field to be measured by a few names in the principal chairs; for the published works of RICHARD ("L'origine de l'idée du droit"), MICHOUD ("La théorie de la personnalité morale"), CRUET ("La vie du droit"), ROLIN ("Prolégomènes de la science du droit"), TANON, chief justice of the Court of Appeal ("L'évolution du droit");

LEROY ("La loi"), and others, demonstrate that the entire region of general jurisprudence and philosophy of law is being cultivated with abundant originality and power for the coming generation.

A more ample view of the scope of current French work on these subjects is obtainable in vol. VII of the Modern Legal Philosophy Series, entitled "Modern French Legal Philosophy" (Boston, 1916).

Criminal Law. Criminal law is now everywhere becoming recognized as dependent on Criminal Science in general (or Criminology), and thus presents many common problems of theory and method in all countries. France's contributions to Criminology are elsewhere in this volume fully treated under that head. It is enough here to note that the study of Criminal Law itself is in France fully in touch, both in theory and in legislative spirit, with the forward movement of the last half century.

The French Penal Code of 1810 was the first radical legislative response in Europe to the humanizing revolution of opinion led by Beccaria, Howard, and Voltaire. Progress in theory during the nineteenth century was followed by successive legislative reforms in all fields; legislation for juvenile offenders, for example, was enacted as early as 1875; for release on parole, in 1885; and for suspended sentence, in 1891. In the subjects of criminal procedure, of indeterminate sentence, and of revision of penal definitions generally, discussion still progresses. The student will find in France as in America the same general and active ferment of constructive inquiry, experiment, and debate, among all interested groups. The scientific and literary activity outside of the Universities would make a long bibliography, and indicates the fertility of current French thought in this field.



PAUL FRÉDÉRIC GIRARD (1852-)

LAW

In the law schools, Criminal Law receives in general more attention than in any American law school. At Paris, there are two professors,—GARÇON, who has annotated the Code Pénal, and LE POITTEVIN, who has annotated the Code d'Instruction Criminelle; the latter has also published elaborate practical treatises on Criminal Procedure, Police Procedure, and Judicial Records; both give alternately a course in Comparative Criminal Law. The masterly treatise of SALEILLES (recently deceased; one of France's most famous modern jurists), on "The Individualization of Punishment," has been translated into English for an American Committee, in the Modern Criminal Science Series.

At Lyon is GARRAUD, the best known criminal jurist of France. Enough to say that his two treatises on Criminal Law and Criminal Procedure (six volumes each, now appearing in their second and third editions) are the most nearly perfect of their kind in any language. At Bordeaux is BONNECASE; at Caen, DEGOIS; at Dijon, ROUX; at Grenoble, GUÉTAT; at Lille, DEMOGUE; at Rennes, CHAUVÉAU; at Toulouse, MAGNOL; at Montpellier, LABORDE, who offers a special course in Criminal Procedure and Penal Methods.

International Law and Public Law. The general activities and the university instruction in these two fields are so fully set forth in the chapter on Political Science, in this book, that a repetition here is needless. Suffice it to say that in each of them the student of law will find the most extensive and helpful opportunities.

General Legal Subjects. In addition to the foregoing subjects of supranational interest, the American student will find a valuable field for comparison in the courses on distinctively national law, both in the arrangement of

the curriculum and in the mode of teaching and study. In two main respects the curriculum differs from the accepted American plan,— it includes more of political and legal science, i. e., non-private law subjects, and it makes fewer subdivisions of the private law. For example, the three-year curriculum for the Licence degree at Paris covers, respectively, six, six, and eleven courses; of these twenty-three courses, three are in political economy, two in Roman law, two in international law, three in public and administrative law, one in history, and one in colonial legislation; leaving three for commercial law, one for criminal law, two for civil procedure, and five for civil or private law. The last group would with us be so subdivided as to form at least two thirds of the curriculum. In the curriculum for the Doctorate, all of the above subjects are pursued in advanced topics, with fewer lecture hours and with opportunity for specialization. In some of the provincial universities (but not in Paris), there is a separate Institut Pratique de droit, and (in Paris also) an École du Notariat, where the technical niceties of pleading, practice, and conveyancing, are specially studied. Thus the foreign student is less likely, under the regular University curriculum, to find the local practitioner's point of view as prominently emphasized as it is in most American schools.

Methods of Instruction. The American law student, trained in the case-system of study and the Socratic method of instruction, finds himself in the French law school an attendant at formal lectures, where he is a mere "auditeur." The size of classes (especially at Paris), and the traditions of French teaching, have not encouraged the close contact of faculty and student that obtains in the best American schools today. This may be at first a cause of disappointment, and even of discourage-

ment, to the energetic student. But it should rather prove a test of his mettle. The problem of self-adjustment to new methods and materials is of itself valuable to the thinker. And, of course, to the earnest and talented aspirant, personal contact with the most eminent professors is attainable.

Perhaps equal in value to the acquirement of positive knowledge are the influences of the French "milieu," scholastic, public and private; these, if the student be sensible to them, must inevitably draw him, as an earnest partisan on one or the other side, into the stimulating movements which are characterizing French thought today.

Finally it may be noted that the French genius for formal public expression should offer to the receptive American aspirant a stimulus and a model, such as would profit both the practitioner and the university teacher in America.

MATHEMATICS

MATHEMATICS¹

The study of Mathematics has always made a special appeal to the French genius, distinguished by its fondness for logic and its striving for perfection in form. Since the time of VIETA, FERMAT, DESCARTES, and PASCAL, there has never been a period in which French mathematicians have not held a commanding position in their field. In particular, during the great epoch of 1730-1820, when the Calculus and its applications received their formal development, it has been well said that "the scepter of Mathematics was in French hands." To justify this, one needs mention only the names of LAGRANGE, LAPLACE, LEGENDRE, PONCELET, and MONGE, among a host of others.

Though this period was followed by one somewhat less brilliant, especially after the passing of FOURIER and POISSON; yet the work of CAUCHY alone, in the first three decades after 1820, would have upheld the great tradition. To this epoch also belong GALOIS, who before his death at twenty-one had discovered principles that recreated modern algebra, and STURM and LIOUVILLE, whose names are attached to fundamental results in algebra and the theory of linear differential equations.

To HERMITE belongs the distinction of leading the French school of mathematicians from the death of CAUCHY till the rise of the present group, who may well be regarded as having restored the preëminence of

¹ Drafting Committee: D. R. CURTISS, Northwestern University; T. F. HOLGATE, Northwestern University; E. H. MOORE, University of Chicago; E. B. WILSON, Massachusetts Institute of Technology.—ED.]

France in Mathematics. He was in a special sense their master, equally great as teacher and scholar, and, in the wide field he covered, typical of the modern school. Among the notable contributors of this period was CHASLES.

The present era in French mathematics may be said to date from the early work of DARBOUX and JORDAN, in the late sixties and early seventies. In rapid succession appear the names of PICARD, POINCARÉ, APPELL, PAINLEVÉ, GOURSAT, HADAMARD, and BOREL. Nor have the achievements of the still younger group given ground to believe that successors will be wanting. The brilliance of the modern school has been enhanced by the broadness of its leaders' achievements; the contributions of PICARD, POINCARÉ, and HADAMARD, for example, have been remarkable in geometry, algebra, and applied mathematics, as well as in analysis. The latter field has, however, been perhaps the most cultivated.

No account of recent French mathematics can be complete which fails to yield its tribute to the genius of POINCARÉ. At his death, in 1912, it was the universal verdict that he must be considered the greatest mathematician of his age.

Mathematicians of Today and their Work. It has undoubtedly been true for many years that the group of mathematicians resident in Paris was the most distinguished to be found at any one place in the world, and there is no reason to believe that this situation will soon be altered. The centralization of French scientific activity presents distinct advantages to the mathematical student from abroad, especially to the man of more mature type. The older and more eminent mathematicians are grouped in Paris. However, many of the provincial universities have on their faculties one or more men, usually of the younger scholars, who have such special



HENRI POINCARÉ (1854-1912)

MATHEMATICS

knowledge of a given field that the visiting student cannot afford to ignore the opportunity of working with them. Thus, within a few years past two younger men as well-known as BOUTROUX and FRÉCHET were to be found at Poitiers; and, to mention but one other name, BAIRE was at another provincial university. The university of Toulouse has always had a strong mathematical faculty.

The dean of French mathematicians, still active, is DARBOUX, perhaps the most distinguished living worker in the field of differential geometry. His great treatise is the standard authority on that subject. In spite of the demands made on his time by his other duties (he is, for example, permanent secretary of the Academy of Sciences), he continues to give each year a course at the Sorbonne on higher geometry that no visiting student can afford to miss. It would be worth while to sit under him, if only to absorb something of his great charm as a lecturer.¹

PICARD is equally noted for his life and inspiration in the class-room; he is one of the few men who are great both as teachers and investigators. For nearly forty years his contributions to the theory of functions and to differential equations have been of fundamental importance. Many of them have been summed up in his great "*Traité d'analyse*," of which the fourth and last volume is still in preparation, and in the two volumes of the "*Théorie des fonctions algébriques de deux variables indépendantes*." The field represented by this last work has of late years especially occupied his attention. His lectures at the Sorbonne share with Darboux's the distinction of being among the most popular under the Faculty of Sciences.

¹[We regret to chronicle, since this chapter went to press, the death of this eminent scientist.—AUTHORS.]

Although APPELL has long been dean of the Faculty of Sciences at the Sorbonne, he has continued to give a course there each year. His contributions to analysis and applied mathematics are indicated by his well-known volumes on algebraic functions and their integrals (in collaboration with GOURSAT), on elliptic functions, (jointly with LACOUR), and especially by his three-volume "Traité de mécanique rationnelle." He has been especially distinguished as a teacher, and for a number of years gave a most successful course in the Sorbonne on general mathematics for students of other sciences; this is now accessible in published form. In 1915-16 he lectured on analytic mechanics and celestial mechanics.

GOURSAT has long covered the field of differential and integral calculus at the Sorbonne. His lectures have formed the basis of his celebrated "Cours d'analyse," one of the most widely used modern texts in its field. Only less well-known are his works on partial differential equations and on algebraic functions, while his frequent contributions have made his name familiar to readers of mathematical periodicals.

BOREL bears the title of professor at the Sorbonne, and in some years has given public lectures there. In the year 1915-16, however, his work was confined to the École Normale Supérieure, and was open to visiting students only by special arrangement. He may be considered, perhaps jointly with HADAMARD, as the leader in a younger group of French analysts. He is probably best known by the series of monographs (on the theory of functions) of which he is the editor, and of a number of which he is the author.

In 1915-16, GUICHARD and CAHEN gave courses in the Sorbonne on rational mechanics. Both these men have done important work also in other fields, the former in geometry, the latter in the theory of numbers. Their

brilliant predecessor in the chair of mechanics, PAINLEVÉ, has been for a time occupied with governmental work, as Minister of Education.

The courses of BOUSSINESQ and KOENIGS in mathematical physics should also be mentioned, though they lie partly without the field we are considering.

In addition to the lecture courses mentioned above, conferences were held at the Sorbonne and the École Normale in 1915-16 by LEBESGUE, whose new theory of integration is already classical; VESSIOT, perhaps best known for his work in extending the Galois theory to linear differential equations; CARTAN, whose name is familiar to students of group theory; and MONTEL, who has made brilliant contributions to the theory of functions.

If we have deferred mention of HADAMARD, it is not because he can be assigned any other than a foremost position among French mathematicians, but on account of the fact that his work is not at the Sorbonne, but at the Collège de France and the École Polytechnique. At the latter institution his classes are not open to the public; but at the former, where he holds the chair of Analytic and Celestial Mechanics, all hearers are welcome. His courses are by no means confined to the subjects indicated; in the year 1915-16 he lectured on the analytic theory of prime numbers, to which he made contributions of such fundamental importance in his earlier work. Like Poincaré, his genius has covered almost the whole field of mathematics, and he has especially enriched analysis and applied mathematics by his researches.

At the Collège de France one may also hear the lectures of HUMBERT, perhaps best known by his "Cours d'analyse." His work is mainly in algebra and analysis. The courses in mathematical physics given here by

BRILLOUIN and LANGEVIN fall at least partly in the field we are considering.

Special Facilities for Work in Mathematics. The difficulty of obtaining personal assistance and direction has by some been considered, in past periods, an obstacle to the study of mathematics in France. It is true that there is nothing like a seminary system, but men of some maturity who are pursuing research along a special line will find the experts in that field glad to confer with them. The leaders in French mathematics are unusually accessible personally, and many American students have derived inspiration and encouragement from them.

It is possible for foreign students to obtain admission to the École Normale Supérieure, and in the past a few have done so. One may thus attend courses closed to the public and have access to the large mathematical library of the school. The mere association with the intellectual élite of French students is a privilege worth while in itself.

The great library of the Sorbonne has a complete mathematical collection; one who joins the French mathematical society has the privilege, enjoyed by members, of access to the shelves of the library. Another mathematical collection of considerable value to one lodged in the student quarter of Paris is that of the Bibliothèque Sainte-Geneviève.

MEDICINE
INCLUDING
INTRODUCTORY SURVEY,
PHYSIOLOGY, NEUROLOGY,
MEDICINE, SURGERY,
AND PATHOLOGY

INTRODUCTORY SURVEY OF FRENCH MEDICAL SCIENCE¹

To catch and imprison within the rigid symbols of language the spirit of a people, as shown in any aspect of their national life, so that the printed page may render back to each reader a faithful picture, is as difficult as the task of the painter, who would depict upon his canvas not merely the features, but the essence of that inner life which lies back of the ever-changing expression as a central unity. Without this there can be no true portrait. French medical science, in the modern sense, has a history of a little more than one hundred years, of rapid growth, of constantly increasing diversification, of shifting interests like the swing of the pendulum, often too far to one side, then to the other. Nevertheless, through it all can be traced something individual, a central stream of tendency essentially French, which, impinged on from either side by the flow of thought into it from other lands, has produced the actual achievements in each of the lines of special endeavor that will be recounted in the chapters which follow.

Sympathy and imagination are perhaps the most characteristic attributes of the French mind, as common-sense and justice are of the Anglo-Saxon, and orderliness of the German. Sympathy and imagination may, I believe, be traced through the whole development of French medicine. Wide and sympathetic interest in the relief of human suffering through the advance of knowledge of disease has been instinctive in their greatest scientists,

¹[Drafting Committee: T. C. JANEWAY, Johns Hopkins University.—ED.]

and has prevented that intense absorption in a single field of research which leads to complete detachment and isolation of the investigator. Because of this, French physiology, from MAGENDIE through the immortal Claude BERNARD and MAREY to its modern exponents, has always been experimental medicine. Each of these men, while aiming at the elucidation of the normal function of the body, constantly strove to apply his discoveries to the unraveling of their complex disorders. The mention of Claude Bernard's name evokes first of all the thought of diabetes, not of the normal liver function. These men taught as they thought, presenting their subject in its relation to pathology and to clinical medicine, not as something independent and self-sufficient. The earlier chapters of Claude Bernard's "*Leçons de physiologie expérimentale*" contain the program of the modern medical clinic, set forth with a cogency and a lucidity which have never been equalled, a program which we are only just beginning to realize. So too PASTEUR, the chemist, with the highest type of scientific imagination, seeing in his discovery of the nature of putrefaction the key which would unlock the door to knowledge of the infectious diseases, and planning the simplest experiments by which he might reach his goal, is kin to the creative artist who, with a few bold lines, draws the picture that will live when mere photographs, with all their wealth of detail, shall have faded into nothingness.

Closely allied to the insight which grows out of imagination and sympathy is a certain attitude toward reality as a whole, which the French exemplify in their thought as in their medical science. They love life in all its baffling complexity better than abstract formulations. An intense desire to see and accurately describe every varied feature of disease in the actual patient has enabled French physicians to detect and record for the first time many

rare morbid conditions and symptoms. They have been masters of the arts of clinical observation and description. This interest in the actual, in seeing things as they are through one's own eyes, is of all qualities the most important for the practitioner of medicine. It consorts ill with the tendency of the compiler, who laboriously gathers from other sources than his own experience all existing knowledge, and, systematizing it, makes it available for the mass of men. He is the bookkeeper of science, useful but uninspiring. The infinite variety of the expressions of disease in the individual has at times led the French school to erect unnecessary distinctions; but, in spite of occasional excesses, its keen discriminations have been the means of detecting many unsuspected clinical syndromes. Because of this fundamental interest in the concrete, French medical students have always entered the hospitals from the very beginning of their course, and have seen sick patients during the years in which they were mastering anatomy, physiology, and the other underlying medical sciences.

Finally, that passion for the mastery of his language as a vehicle for thought, which is so strong in the Frenchman, has lent to his medical teaching and to the publication of his scientific work a clarity, elegance, and charm which are rarely equalled in any other country. To the earnest student of medicine the manner in which he clothes his ideas can never be of small consequence; and the example which will be constantly before him as he listens to the presentation of a case in the hospital ward, or to the announcement in a few concise and telling words of an important discovery at a meeting of the *Société de Biologie* or the *Société des Hôpitaux*, will be one worthy of emulation.

In modern science, machinery and method have of late almost obscured from view that hidden, but essential,

factor in progress, the mind of man. Machinery and method have proved their value, and we shall not discard them. France has perhaps in the past laid too little stress on the organization of research, but she has never failed to preserve that atmosphere of free intellectual inquiry and unconquerable scientific curiosity in which the genius who creates new machinery and devises new methods to solve new problems can best develop. The first great American physicians, one hundred years ago, sought in Paris at the feet of LAËNNEC and LOUIS, of PINEL and RICORD, of DUPUYTREN and VELPEAU, and of the great MAGENDIE, the inspiration which enabled them to lay the foundation of scientific medicine in our land. American medical science is now thoroughly organized, rich in facilities for research in hospitals and laboratories, full of enthusiasm for high achievement. It must appropriate and adapt to its own uses the best that it finds in all lands. In France it will find scientific imagination of the highest order, sympathy so wide as to unite all groups of specialists in devotion to the aims of medicine as a whole, acute observation of the finer details of clinical symptoms, a spirit which loves reality so intensely that it will not cramp it within too simple and artificial categories, and the best model for its imitation in the creation of its medical literature.



CLAUDE BERNARD
(From a painting in the Sorbonne)

MEDICINE: PHYSIOLOGY

PHYSIOLOGY¹

The historian who attempts to trace the development of modern physiology (that is to say, physiology as an experimental science based on physics and chemistry) will find it necessary to refer constantly to the names of the great French physiologists of the 19th century, François MAGENDIE and Claude BERNARD. While much good work was being done in England at that period, largely on anatomical lines, and in Germany Johannes MÜLLER and his famous pupils were making notable contributions to physiology and, indeed, to biology in general, the really modern spirit of physiological research found its most earnest advocates and exemplars in the two French physiologists named. In his wonderful experimental lectures, given at the Collège de France, MAGENDIE over and over again emphasized the importance of experimental investigation as opposed to speculation and theorizing, and in his words and by his works he indicated clearly the lines along which physiology should advance,—the lines in fact along which it has advanced. His great pupil BERNARD, filled with his master's spirit, and endowed with a scientific mind of the first order, made those remarkable discoveries which entitle him to be ranked as the greatest physiologist that the world has produced. At that time physiology was the sole experimental medical science; and the great influence exerted by these two men made itself felt not only upon the subsequent development of physiology

¹ [Drafting Committee: WM. H. HOWELL, Johns Hopkins University.—ED.]

as a separate science but in the modernization of medicine as a whole. Medical men from all countries went to Paris to work with Bernard, and by this means his influence was extended through personal contact over a wide area.

In addition there grew up round him a group of pupils, MAREY, FRANÇOIS-FRANCK, BERT, RICHEL, d'ARSONVAL, GREHANT, DASTRE, and others, who in their turn have contributed brilliantly to the advancement of the subject. The work of BERT upon barometric pressure is worthy of special notice. Conceived and executed in a scientific and comprehensive spirit, it met at first, singularly enough, with some bitter criticism from abroad; but it has since come to be recognized as the classic and starting point for all investigations dealing with the physiological effects of variations in atmospheric pressure. No less noteworthy are the important contributions made by MAREY to the study of movements and the development of a beautiful technique for graphic reproductions of all kinds. Physiologists of all countries are deeply indebted to his genius in devising apparatus and methods.

The living French physiologists comprise such names as RICHEL, DASTRE, d'ARSONVAL, FRANÇOIS-FRANCK, GLEY, WEISS, MORAT, DOYON, LANGLOIS, NICLOUX, LAPICQUE,—names known to the physiologists in all countries because of the important contributions to science associated with them. RICHEL has had the honor of a Nobel prize for his fundamental work in anaphylaxis. D'ARSONVAL, brilliant as a physicist as well as physiologist, is remembered also in connection with some of the early work upon internal secretions done in collaboration with BROWN-SÉQUARD. GLEY's work has taken a wide range, but his contributions to the physiology of the internal secretions, especially of the parathyroid

glands, have been of fundamental importance. FRANÇOIS-FRANCK has published many beautiful papers upon vasomotor regulation, important in their results and models of technical skill. DASTRE, in his own name and through the workers in his well-equipped laboratory, is known for work in all branches of physiology and physiological chemistry. The work of these men and their pupils includes all the existing fields in physiology.

The longer contributions appear in the "Journal de Physiologie et de pathologie générale," the successor to the well known "Archives de Physiologie normale et pathologique;" but the pages of the weekly journal "Comptes rendus de la Société de Biologie" teem with shorter communications that touch on every phase of biological research, and reflect like a mirror the latest thoughts and aspirations of the workers in science.

Instruction. Any student who wishes to pursue advanced work in Physiology or desires instruction in modern methods of research will find in France, and especially of course in Paris, able and distinguished teachers and ample laboratory facilities. In the laboratories of the Faculté de Médecine, at the Sorbonne in the Faculté des Sciences, at the Collège de France, the Muséum d'Histoire Naturelle, and the Institut Pasteur, opportunities are offered for investigative work in all branches of physiology, and in biological chemistry and physics. Details in regard to the lecture courses and laboratory courses which may be followed are furnished by the "Livret de l'Étudiant" of the University of Paris; but arrangements in regard to participation in research work must be made of course with the directors of the laboratories.

Libraries are numerous and complete. In addition to the great Bibliothèque Nationale, there are special

libraries at the School of Medicine, the Pasteur Institute, the Biological Society, etc. In the use of these libraries the American student will not find the same freedom and liberality that he is accustomed to in American universities. So far as the writer is informed none of the Continental libraries follow the generous American plan of giving students free access to books and periodicals. But if the regulations in force are learned and observed, no serious difficulty is encountered in obtaining any literature that may be desired.

Outside this routine work in lectures and in laboratories, the physiological student in Paris has an almost unequalled opportunity to acquire a broad cultural basis in the related sciences and in the historical development of his subject. Numerous public lectures and exercises may be attended without charge; and in the many museums, especially in the Museum of the Conservatoire National des Arts et Métiers, objects of historical interest in science may be seen and studied.



JEAN MARTIN CHARCOT (1825-1893)

MEDICINE: NEUROLOGY

NEUROLOGY¹

Since the dawn of scientific medicine the neurology of France has been preëminent, sometimes almost to the point of isolation. And the present maintains the traditions of the past. Now, as formerly, productivity in this department is largely concentrated in Paris. Unless it be on account of some sporadic activity (such as the work in hypnotism at Nancy thirty years ago), the student of nervous diseases will have no occasion to go elsewhere. In the Capital the science and art of neurology flourish as on no other soil. Enormous hospitals and infirmaries furnish clinical and pathological material without parallel, and here are more men of parts actively engaged in neurological work than in any other city of the world. The Société de Neurologie de Paris is the best, the best organized, and the most active neurological society in existence. There are numerous laboratories where research work is constantly prosecuted; there are regular courses covering the various aspects of neurology; during vacation periods there are short courses for graduates; and there is a medical library of 160,000 volumes. Added to this, there is a policy of freedom, a ready accessibility, and a personal welcome such as are found in no other great medical center of Europe.

In presenting a brief outline of the opportunities for graduate work in neurology we may assume that the

¹ [Drafting Committee: HUGH T. PATRICK, Northwestern University; MORTON PRINCE, Tufts College.— Ed.]

student has mastered the more elementary steps. If he has not, there are laboratories where he can familiarize himself with the structure of the nervous system and histological technique. Likewise he will find practical courses in methods of clinical examination, diagnosis, and treatment. Such courses are given especially in connection with the Clinic for Diseases of the Nervous System at the Salpêtrière, where the material is peculiarly rich.

The more advanced student will wish to spend his time with the leaders of French neurology in the various hospitals and in the laboratories for research and pathological work. Here it is difficult to separate the man from the institution, and consequently we shall make an attempt to consider them together,—a quite illogical, but we think useful method. And first of all,

La Salpêtrière (Hospice de). This is a huge infirmary or poorhouse for women. But it is on a hospital basis, divided into well organized services with complete attending and house staffs, the patients studied and recorded as in any modern hospital. It was here that CHARCOT pursued his epoch-making researches and where he finally induced the faculty to establish the far-famed university clinic for diseases of the nervous system. Later, to this service were added two large wards for men. On this terrain Charcot developed what was known as the School of Charcot, and here delivered the scintillating clinical lectures which have been the admiration and despair of other teachers and have remained a tradition and an example for his followers.

On his death in 1893, he was succeeded temporarily (two years) by the brilliant and beloved BRISSAUD, whose two volumes of lectures here delivered are neurological gems. The productive RAYMOND followed him;

and the present incumbent is J. DEJÉRINE,¹ who for many years has been one of the strongest neurologists of France. He is the author of a remarkable "*Sémiologie des Maladies du Système Nerveux*"; with Mme. Déjérine has written a great *Anatomy of the Nervous System*; and has published innumerable valuable papers. During the school year he gives two clinics a week. That of Tuesday is more informal, more directly practical, involving the presentation of more patients without exhaustive consideration of any subject. The Friday lecture generally is devoted to more fundamental, systematic treatment of some disease or problem, and the same subject may run through several lectures. The great wealth of clinical material makes these lectures extraordinary. With this service is a large out-patient department.

At the Salpêtrière is also another immense service practically devoted to nervous diseases. The head is Pierre MARIE, perhaps the most celebrated neurologist of France. Only to catalogue his notable contributions to neuro-pathology would require a small book. Perhaps he is best known from his work on acromegaly, various aspects of apoplexy, scoliose rhizomelique, and aphasia; but there is scarcely a phase of organic disease of the nervous system which he has not touched to illuminate. He delivers no formal lectures but once a week has a "consultation d'externe," or dispensary service, where he holds an extemporaneous clinic. The patients are examined under his eye, and he makes diagnoses, comments and explanations. Of necessity the work is rapid and hence rather superficial; but the master exhibits a combination of erudition, perspicacity, and perspicuity,

¹ [We regret to have to chronicle his decease, which occurred after this chapter went to the printer. Presumably he will be succeeded by Marie.—AUTHORS.]

to be met not more than once or twice in a lifetime. For the student of nervous diseases it is a mine of information and inspiration. For more mature study and treatment many of these patients are taken into the wards which Marie visits nearly every day. The ward visits are free to any graduate, who thus hears the reports of assistants and internes, the comments, corrections, and conclusions of the chief. This is not a course of instruction, but routine work, and the visitor's tact will indicate to what extent he may ask questions.

In connection with these two dominant services at the Salpêtrière, associates and assistants frequently give courses relating to some special subject. These junior members of the staff are trained and generally eminent neurologists. One may mention André THOMAS, who knows as much of the cerebellum as any man; Henri MEIGE, who (following Brissaud) has made a profound study of the various tics; CROUZON, a good all-round man; FOIX, who is a laboratory expert as well as a good clinician; and whosoever happens to be chief of clinic for Déjérine.

In connection with the University clinic, but used also by the other services, is a very complete electric department under the personal direction of Dr. BOURGUIGNON, capable, enthusiastic, amiable. This, like everything else, is quite accessible to the graduate student, and offers unequalled opportunity to become familiar with electrodiagnosis and electrotherapeutics.

We may here state, for the Salpêtrière as well as for all other hospitals and infirmaries of Paris, that the qualified graduate will have no difficulty in associating himself with assistants and internes so as to watch their daily work, learn their methods and become acquainted with their cases. In many instances he may procure the privilege of examining patients himself, thus becoming

familiar with rare types as well as classical clinical pictures.

Bicêtre (Hospice de) is an infirmary for men, corresponding to the Salpêtrière (though not so conveniently located), and is second only to the latter in wealth of neurological material. In the nature of things the cases are mostly chronic. Here patients are kept and observed, and here they come to autopsy. At Bicêtre the visitor will find many a patient who has served as text for a dissertation; he will recall his picture seen in a medical journal, and later he will read of the post mortem findings. Prof. A. SOUQUES, who was preceded by Déjérine and Pierre Marie, now has the choice service. As a rule he gives no regular course of instruction, but one may always make the ward visits with him and will be richly repaid. He is one of the ablest and best informed of the Paris school, as well as one of the most approachable, and he has a collection of patients not to be duplicated. Their careful study is well worth the time of any neurologist.

In the same institution is a huge service for the feeble-minded (idiots and imbeciles), where BOURNEVILLE made his remarkable pioneer studies and whence issued his valuable detailed reports.

L'Hôpital de la Pitié should next be mentioned, because here is BABINSKI, universally known from the reflex called by his name; certainly one of the most original, astute, and forceful of living neurologists. He seems to combine Gallic brilliance with the methodical thoroughness of the German, and by some is considered the greatest French neurologist. Having true scientific insight, the fruit of his labor is rarely without value. Deprived of his contributions on the reflexes, on spinal and brain-stem localization, on cerebellar disorders, hysteria and many other things, modern neurology would be far from

being what it is. He has not nearly so many beds as Marie, Dejérine, and Souques; but his turnover is more rapid, he has more acute cases and also a large outpatient following. During at least one semester he gives a course of semi-weekly clinical lectures which are unexcelled and which no student of neurology can afford to miss. Also one may make the ward visits with him and witness the examination of such patients as are brought to his "cabinet."

Ivry is a suburb where is located another huge hospice, like the Salpêtrière and Bicêtre, and like them it houses a large number of neurological cases. Until the outbreak of the present war this service was in charge of Prof. J. A. SICARD. This conflict once over, probably he will be transferred to a service within the city. Wherever he may be, he is well worth following, as he has had quite exceptional training, and is one of the most clear-sighted, enthusiastic, and energetic of the present generation.

The government plan of promoting hospital physicians ("médecins des hôpitaux") from one service to another makes it impossible to predict where the younger men may be found a year hence. Still, we must indicate some of these rising and risen men, whose courses should be taken and whose services visited as occasion offers. A full list is impossible; but of the best are Georges GUIL-LAIN, Henri CLAUDE, HUET, ALQUIER, André LÉRI, LAIGNEL-LAVASTINE, CAMUS, KLIPPEL, ENRIQUEZ, JUMENTIÉ, and LHERMITTE; for surgery of the nervous system, DE MARTEL.

We would particularly note that no follower of neurology should miss the monthly or semi-monthly meetings of the Société de Neurologie.

Laboratories. In addition to the regular University laboratories of anatomy and pathology, there are laboratories of neuro-pathology in connection with the services

of Dejerine, Marie, Babinski, and Souques. That of the Clinic for Diseases of the Nervous System is extensive and well organized, and offers instruction in laboratory methods and normal and abnormal nervous tissues. In all of them a volunteer competent to work on pathological material or to carry on research work will be welcome, and will have the guidance, the support, and the inspiration of trained experts. Gustave Roussy, who is chief of the University laboratory of pathology, is a trained neurologist and especially interested in pathology of the nervous system.

Psychiatry. The focus of psychiatric teaching is at the Asile Sainte-Anne, where the professor of this department of medicine is chief and where he gives clinics. Who is to succeed the late lamented BALLET is not now known to us, but he is sure to be a strong man and a good teacher. For years it has been customary at this institution to give a two-hour clinic on Sunday mornings. At Ste.-Anne there is also another large service in mental diseases, so that the student devoting himself to this branch can with profit put in a large part of his time here. At the Salpêtrière and at Bicêtre are departments for the insane, freely accessible to graduates and where from time to time courses are given.

As nearly all ward visits are made in the morning and most clinical lectures delivered "ante méridian," the student devoted to clinical work alone may be a little embarrassed in the disposition of his afternoons. Especially welcome to him will be the Infirmerie Spéciale du Dépôt in the Quai de l'Horloge where every afternoon Prof. Ernest DUPRÉ (the worthy successor of LASÈGUE and GARNIER) examines those mentally deranged or suspected of mental disorder who have been arrested or picked up by the police. The work involves no profound study of any case, as the Infirmerie is a depot of transit;

but we believe that nowhere can one so well learn how to go quickly to the kernel of a case of insanity. In most semesters Dupré gives a clinic once a week at which the cases are gone into more in detail. He is a psychiatrist of the highest order and a fine teacher.

The Société de Psychiatrie and several excellent journals afford the forums and clearing houses necessary to maintain the traditions and continue the honorable heritage of French psychiatry.

MEDICINE¹

In France at the beginning of the last century modern methods of clinical observation had their birth.

BICHAT, following the great MORGAGNI, began to reveal those changes which occur in the organs as the result of disease, and to correlate the pathological alterations with symptoms which occur during life. And when his too short day was past, there followed a remarkable group of eager clinicians who endeavoured on the one hand, by physical means, to detect these changes during life and by the accumulation of careful clinical and post mortem observations to improve the art of diagnosis; and on the other, by the employment of a rigid statistical method to test the accuracy of diagnosis and treatment. It was into French that the generally neglected contribution of AUENBRUGGER, announcing the discovery of the art of percussion, was first translated (de Rozière de la Chassagne, "Manuel des pulmoniques, etc.," 16°, Paris, Humaire, 1770); and later, in 1808, it was CORVISART who first recognized the value of percussion and introduced it into general use (Auenbrugger, "Nouvelle méthode, etc.," par J. N. Corvisart, 8°, Paris, Migneret, 1808).

LAËNNEC followed with his discovery of the art of auscultation, which for the first time made possible the accurate diagnosis of diseases of the chest. The clinical methods of this great man, as set forth in the preface of his famous work "L'auscultation médiate, etc.," (8°,

¹ [Drafting Committee: W. S. THAYER, Johns Hopkins University.—Ed.]

Paris, Brosson & Chaudé, 1819) are models for all time. His descriptions of emphysema, bronchiectasis, pulmonary oedema, and hepatic cirrhosis, are classical.

These precursors were followed by a remarkable body of students of whom a few may be mentioned:

BOUILLAUD, whose acute observations first called attention to the relation between acute polyarthritis and endocarditis, was also one of the earliest to point out the phenomena of cerebral localization. ANDRAL and CHOMEL, able clinicians and conscientious observers. RAYER, one of the earliest students of diseases of the kidneys, whose beautiful atlas is still regarded as a treasure by the fortunate possessor. LOUIS, who through his patient studies and his "numerical method," contributed greatly to the elucidation of the symptomatology of tuberculosis, of yellow fever, and especially of typhoid fever which he and his students first clearly distinguished from typhus. To Louis' influence more than to that of any other one man do we owe the introduction of accurate clinical methods into America. Inspired by him, a large group of students, including the Jacksons, the Warrens, Bowditch, Holmes, and Shattuck of Boston; Alonzo Clark, Valentine Mott, and Metcalf of New York; Gerhard, Norris, Stillé, Clymer, Ruschenberger, and Pepper, Sr., of Philadelphia; Power of Baltimore; Gaillard, Gibbs, and Porcher of Charleston; Cabell, Selden, and Randolph of Virginia; brought home enthusiasm and ideals which have been of incalculable benefit to American medicine.

BRETONNEAU, celebrated for his studies on diphtheria to which he gave its name. VILLEMEN, who in 1866 demonstrated the transmissibility of tuberculosis. TROUSSEAU, the brilliant clinician, author of the celebrated Clinique de l'Hôtel-Dieu. MAREY, initiator of graphic methods of the study of the circulation. POTAIN,



LOUIS PASTEUR (1822-1895)

MEDICINE: MEDICINE

whose early studies on the blood pressure and other cardio-vascular problems contain so much that is suggestive and valuable; author with Teissier, Vaquez, François-Franck and others, of "Clinique médicale de la Charité" (8°, Paris, Masson, 1894). LANCEREAUX, who first suggested the relation of the pancreas to diabetes. HUCHARD, student of diseases of the circulatory apparatus. RICORD, whose contributions to venereal disease, especially to the definite separation of syphilis and gonorrhoea are, as Garrison has said, "memorable in the history of medicine." FOURNIER, the famous syphilographer. HANOT, well known for his studies on cirrhosis of the liver, who, with Chauffard, first described pigmented cirrhosis. CHARCOT, probably the greatest clinician of his day, whose earlier contributions on various branches of general medicine were scarcely less valuable than his classical studies upon nervous diseases which followed. DIEULAFOY, student and successor of Trousseau, fascinating clinician, author of the well-known treatise on medicine and of six volumes of clinical lectures. DUCHENNE of Boulogne, the great neurologist; BRISSAUD, JOFFROY, GILLES DE LA TOURETTE, LANDRY, and MORVAN, to mention but a few only of those who have made notable contributions to neurology.

PASTEUR, who opened the whole chapter of the relations of infection to medicine; whose service to mankind looms larger with every addition which has been made to our knowledge of infectious diseases. YERSIN, to whom we are indebted for the sero-therapy and prophylaxis of plague.

These are but a few of the Frenchmen who within the last century have contributed to the advance of medicine.

Instruction. These men have had worthy successors; and it may be well briefly to mention a few of the living

leaders of French medicine whose influence and inspiration the student of today may seek.

ROUX, the director of the Pasteur Institute, who with Yersin, in 1888, demonstrated the existence of the toxin of diphtheria, and later, independently and almost simultaneously with Behring, introduced the method of treating diphtheria by antitoxin.

RICHEL, the brilliant professor of physiology, who with HÉRICOURT in 1888 demonstrated the presence of antitoxic substances in the blood of animals convalescent from infectious diseases; who in 1891 made the first sero-therapeutic injection in man; who with PORTIER in 1902 first demonstrated the important phenomenon of anaphylaxis.

LAVERAN, the distinguished discoverer of the parasites of malaria, who from the laboratory of the Institut Pasteur is still giving forth valuable contributions to parasitology.

LANDOUZY, whose name, with that of DEJÉRINE, is associated with a form of muscular atrophy; who has contributed to many branches of medicine but especially to the study of tuberculosis, pointing out, among the earliest, the almost constant relation of tuberculosis to the so-called idiopathic sero-fibrinous pleurisy. Dean today of the Medical Faculty, he is still active in his clinic for tuberculosis at the Hôpital Laënnec.

DEJÉRINE, professor at the Faculty, one of the most distinguished of living neurologists, author of a monumental anatomy of the nervous system and (with ANDRÉ-THOMAS) of the volume on diseases of the spinal cord in the "Nouveau Traité de médecine et de thérapeutique" (1909); a brilliant clinician whose exercises at the Salpêtrière are most stimulating.¹

Pierre MARIE, professor at the Faculty, who first described the disease Acromegaly and pointed out its

¹ [His death, since this chapter went to press, is chronicled with deepest regret.—AUTHOR.]

association with tumours of the pituitary body; author of many contributions to the science of neurology and especially of the admirable "*Leçons sur les maladies de la moelle*" (1892); editor of "*La pratique neurologique*" (Paris, 8°, Masson, 1911); presides now over a clinic at the Salpêtrière.

BLANCHARD, professor at the Faculty, who is today probably the leading parasitologist of the world.

WIDAL, professor of medicine, distinguished clinician, well known for his adaptation of the Gruber-Durham phenomenon to the diagnosis of typhoid fever; who, through a long series of studies has made important contributions to our knowledge of nephritis, as well as notable investigations concerning haemolytic jaundice; director of a well organized service at the Cochin with good laboratories offering an excellent opportunity for the well equipped post-graduate student.

CHAUFFARD, professor at the Faculty, a brilliant and suggestive clinician; (with HANOT) described pigmentary cirrhosis (1882); author of many contributions to various branches of medicine, including (with LAEDERICH) an excellent work on diseases of the kidney (1909); discoverer of the nature of haemolytic jaundice (1907); director of a service at the Hôpital Saint-Antoine.

VAQUEZ, agrégé, able clinician, whose studies have especially concerned the cardio-vascular apparatus; author of many contributions to medical literature; discoverer of the disease Polycythaemia, which is sometimes spoken of as Vaquez' disease; editor of the "*Archives des maladies du cœur*," etc.; director of an active service at the Saint-Antoine, which should offer a good field for post-graduate study.

LETULLE, professor at the Faculty, author of an important work on pathological anatomy, director of a service at the Hôpital Boucicault.

BABINSKI, distinguished neurologist; author of important contributions to this branch of medicine; presides over a clinic at the Pitié.

MARFAN, professor at the Faculty, a leading authority on diseases of children; one of the ablest and most stimulating clinicians in Paris, whose visits at the Enfants-Malades, where he directs a service, are always replete with suggestion.

NETTER, agrégé, who has made many contributions to the study of the meningitides and of poliomyelitis; director of a clinic at the Trousseau.

GAUCHER, professor at the Faculty, director of the great dermatological clinic at the Hôpital Saint-Louis, where almost unequaled advantages are offered for the study of diseases of the skin; author of an excellent volume on dermatology (1909).

GILBERT, professor at the Faculty of Medicine, director of the old clinic of Trousseau at the Hôtel-Dieu, who has made many contributions concerning diseases of the liver and jaundice; editor of the "Nouveau traité de médecine et de thérapeutique."

ACHARD, professor at the Faculty, director of a clinic at the Hôpital Necker, known especially for his studies of renal function.

JANET, professor of psychology at the Collège de France; director of a laboratory at the Salpêtrière; whose contributions to the study of hysteria are well known.

LABBÉ, agrégé, who has devoted himself especially to the diseases of nutrition and metabolism; director of a service at the Charité.

TEISSIER, agrégé, collaborator with Potain in his studies on the cardio-vascular system; editor of his posthumous volume on the blood pressure; physician at the Claude Bernard.

GUILLAIN, agrégé, one of the most active and productive of the younger neurologists; director of a clinic at the Hôpital Cochin.

BERNARD, agrégé, whose studies on renal function, on the supra-renal glands, and on tuberculosis are well known; one of the editors of the admirable "Annales de médecine."

RIST, director of a clinic at the same hospital, a suggestive clinician who has contributed to many branches of medicine.

LEGUEU, clinical professor of diseases of the urinary tract, director of Guyon's old clinic at the Hôpital Necker, in whose service the valuable work of AMBARD on the normal and pathological physiology of the kidneys was done.

HENRIQUEZ, author of valuable work on diseases of the digestive tract; director of a service at the Pitié.

CASTAIGNE, agrégé, who has written ably on diseases of the kidney and liver.

These are but a few of the many leaders of modern French medicine.

Good opportunities for study are offered also in the well organized clinics of Lyon, where the names of LÉPINE, TEISSIER, COURMONT, GALLAVARDIN, MOURIQUAND, and others, are well known; and in Lille, where CALMETTE, distinguished for his many contributions to bacteriology and serology, especially for his discovery of anti-venine and for his studies on tuberculosis, presides over the Pasteur Institute.

Opportunities for Graduate Work. There are in France few of those regularly organized and rather superficial short courses for post-graduate students which are so well known in some other continental countries. On the other hand, there are good opportunities for

the student who desires to pursue research in any special branch or to acquire experience in clinical medicine.

As one looks back over the past hundred and fifty years it may be said that the French have excelled as clinical observers and as students of the symptomatology of disease. They have been peculiarly talented as clinicians and remarkably acute in the detection of pictures of disease by bedside study and investigation, and in the correlation of these pictures with the underlying pathological changes. The same may be said today. In no country is the clinical symptomatology of disease studied with greater acuteness or intelligence than in France.

The organization of the hospitals as relates to special laboratories for experiment and research has hitherto not been so attractive as in some other European countries; but great advances are being made, and varied opportunities for serious post-graduate study may be found now in many of the clinics as well as at the Pasteur Institute. This is especially true with regard to diseases of the nervous system.

Regular courses of lectures and clinics, all of which are open to the public, are given annually by different members of the faculty. These exercises, which vary in character from year to year, are often as valuable to the post-graduate as to the undergraduate student. The opportunities for clinical observation in the hospitals of Paris during the daily public visits of the physicians are almost unequalled.

Libraries and Museums. Paris offers also great advantages in the way of libraries. The Bibliothèque Nationale, with its unrivaled collections, affords every opportunity for general study. The Library of the Faculty of Medicine, with 160,000 volumes, is accessible to all students, and the privilege to work in the Library

of the Academy of Medicine may be obtained on special presentation.

The Musée Dupuytren has a valuable collection of pathological specimens; and the Musée Orfila at the École de Médecine is an excellent museum of normal anatomy and physiology. Valuable parasitological collections are also to be found at the laboratory of parasitology, and there are special collections at various hospitals.

Societies. Especially valuable to the post-graduate student are the weekly meetings of the Société de biologie, the Société médicale des hôpitaux, as well as the reunions of the Académie de Médecine, at which he may listen to the discussion of the actualities of medicine and biological science by the leading students of the day.

SURGERY¹

Following the Napoleonic wars there was a rapid advance in the French school of surgery, and Paris became the center of graduate study for the entire world.

DUPUYTREN (1777-1835) was the most illustrious French surgeon of the first half of the century. His clinics at the Hôtel-Dieu drew students from all countries. His most lasting contributions were in the field of surgical pathology. He was the first accurately to describe contracture of the palmar fascia and fracture about the ankle joint. His treatises on Injuries and Diseases of the Bones and *Leçons Orales* were extensively translated. VELPEAU (1795-1867) was a great operating surgeon, who wrote the first detailed treatise on Surgical Anatomy; a three-volume treatise on Operative Surgery, and an extensive work on Diseases of the Breast, were also among his writings. VELPEAU's bandage for fixation of the arm is familiar to every medical student. MALGAIGNE (1806-65) was well known for his work in experimental surgery, especially on the healing of fractures. His treatise and atlas on fractures and dislocations remained a classic for many years. He is described by Billings as "the greatest surgical historian and critic whom the world has yet seen." His historical writings dealt especially with the Hippocratic period, and with the works of Ambroise PARÉ, the most famous surgeon of the 16th century, who at the siege of Damvilliers, in 1552, had begun to practise hemostase by ligation.

¹[Drafting Committee: A. D. BEVAN, University of Chicago; D. B. PHEMISTER, University of Chicago.—Ed.]



PARÉ AT THE SIEGE OF METZ
(From a painting in the Sorbonne)

CIVIALE was the first to perform lithotrity in 1824. Auguste NÉLATON (1807-73) had an international reputation as a teacher and operator. He wrote a treatise on surgical pathology, and is familiar to the modern student for his introduction of a valuable rubber catheter.

Paul BROCA (1824-1880) was the first great brain surgeon, and a leader of the modern French school of anthropology. He located the speech center in the third left frontal convolution, and introduced the term "motor aphasia." He invented craniometry, and was an ardent supporter of the theory of evolution; at the period of its introduction he was credited with the aphorism: "I would rather be a transformed ape than a degenerate son of Adam."

The work of PASTEUR revolutionized surgery, as it did all of the other special branches of medicine, but the French surgeons were not the first to see its great practical importance in their particular field. After LISTER had established antiseptic surgery, it was quickly adopted by the French. LUCAS-CHAMPIONNIÈRE (d. 1916) was its earliest advocate in France and on the continent. Aside from his early work on antiseptics and asepsis, he wrote an exhaustive treatise on fractures, in which he advocated early massage and passive motion as the most successful agents for preventing delayed and non-union and stiffness of neighboring joints.

Overlapping the antiseptic period were a number of well known French surgeons. OLLIER (1825-1900), of Lyon, did the most extensive and valuable experimental work of the century on bone regeneration and transplantation. His pathological and clinical writings on diseases of the bones are noteworthy contributions. Félix GUYON (1831-1903) was one of the great genito-urinary surgeons of his time. His clinic at Hôpital Necker attracted students from all over the world.

REVERDIN, of Geneva, belonged to the French school, and is famous for his method of skin grafting, and for his needle which is still extensively used in France.

Many of the French surgeons who have contributed so largely to the advances in aseptic surgery are still living or have died only in recent years. TERRIER (1837-1908) contributed extensively to the development of abdominal surgery, especially to the operative treatment of gall-stone disease. BERGER (1845-1908) was best known for his operative treatment of fracture of the patella and interscapulothoracic amputation. RECLUS has taken a leading part in the development of local anaesthesia. For twenty years he has performed about two thirds of the operations in his clinic at the Hôtel-Dieu under local anaesthesia. JABOULAY, of Lyon, showed the relation between the cervical sympathetic ganglia and the thyroid gland, and introduced cervical sympathectomy for the treatment of exophthalmic goitre. Félix LEJARS is one of the ablest surgical anatomists of the day. His book on emergency surgery has been translated into many languages. Edmund DELORME (1847-) has been a prominent figure in French military surgery, and introduced the operation of pulmonary decortication in chronic empyema. DOYEN (d. 1917) was a brilliant operator, and is well known for his numerous improvements in operative technique and as the inventor of a number of valuable surgical instruments. His magnificent private hospital, excelled by none in its equipment, was in 1917 placed at the disposal of the American Red Cross, under Dr. J. A. Blake.

The names of the leaders in surgery of today will be found in the list of the staff members of the Paris hospitals.

Instruction. The opportunities for graduate work in surgery that attract the American student to France



AUGUSTE NÉLATON (1807-1873)

MEDICINE: SURGERY

are found almost entirely at the University of Paris. Of the specialties that are found at some of the provincial Universities—such as legal medicine at Lyon—space does not here permit an account.

The French school of surgery has been renowned for its efficiency in anatomy, many of the ablest clinicians having advanced from anatomy into surgery. Consequently, excellent opportunities for work in surgical anatomy and operative surgery are to be had, particularly in the department of anatomy at the École Pratique, which is under the direction of NICOLAS. The undergraduate work in surgery is taught in the surgical divisions of the various city hospitals, the staffs of which are controlled by the University. It is in connection with these clinics that the best opportunities for graduate work are to be found. Students work on the service as clinical clerks, have ward walks with the chief and staff, attend the operations and clinics, and work in the outpatient department. It is possible under certain conditions for graduate students to secure these positions, which are analogous to clinical clerkships in the English schools. Special courses in diagnosis and operative courses on the cadaver in general surgery and the various specialties are given from time to time by the assistants in some of the clinics. Laboratories are attached to certain clinics where opportunities for pathological, bacteriological and research work are to be had.

General surgery. In most of the hospitals there is no division of the surgical service; general surgery, genito-urinary surgery, and gynecology being done by the same staff. The principal hospitals with their chief and assistant attending surgeons at the onset of the war were as follows:—Hôpital Beaujon: TUFFIER, with BAZY and MICHAUX. Hôpital Bichat: MORESTIN and staff. Hôpital Cochin: QUÉNU, with SCHWARTZ and FAURE.

Hospice des Enfants-Assistés: JALAGUIER and VEAU. Hôpital des Enfants-Malades: KIRMISSON, with BROCA and PERRIN. Hôtel Dieu: RECLUS, with POTHERAT and Pierre DESCAMPS. Hôpital Laënnec: HARTMANN, with SAUVE. Hôpital Lariboisière: CHAPUT, REYNIER and PICQUE; Oto-rhino-laryngology, SEBILEAU. Hôpital Necker: Pierre DELBET, with ROUTIER; Genito-urinary, LEGUEU. Hôpital de la Pitié: WALTHER and ARROU. Hôpital Saint-Antoine: LEJARS and RICARD. Hôpital Saint-Louis: BEURNIER, RIEFFEL, ROCHARD, and MOUCHET. Hospice de la Salpêtrière: GOSSET.

Gynecology. Most of the gynecology is done as a part of general surgery; but the gynecological clinic of the University is at Hôpital Broca, under the headship of Pozzi. Ward walks, operations, and clinics are held in the forenoon. Special courses in diagnosis and operative gynecology are given by the assistants in the department by arrangement. There is a very efficient gynecological service at the Hôpital Cochin in charge of Dr. FAURE. No regular instruction is given here, but the operations and ward walks are open to visitors and will be found of extreme interest.

Genito-urinary surgery. The French school has long held a leading place in the field of genito-urinary surgery. The University clinic is located at Hôpital Necker. The chair of surgery (formerly occupied by GUYON and ALBARRAN) is now held by LEGUEU. Special courses are given by the chief of staff and assistants as follows: Clinics, by LEGUEU; Diagnostic courses, by PAPIN; Polyclinic and out-patient courses, by MARSAN and DICHIRARA; Practical courses in urine examination, functional tests, etc., by AMBARD; Genito-urinary pathology and bacteriology, by VERLIAC; Cystoscopy, by PAPIN; Ureteroscopy, by MARSAN; Electrotherapeutics, by COURTADE.

Foreign students may be attached to the clinic as monitors for periods of 6 to 12 months. Special afternoon courses for foreign students in cystoscopy and diagnosis and in operative surgery on the male and female are given according to demand.

Orthopedic and Children's Surgery. Special courses in diagnosis and treatment are offered as follows:—Hôpital Trousseau: SAVARIAUD. Hôpital des Enfants-Malades: KERMISSON with BROCA. Hôpital de la Charité: Special clinic on diseases of bones and joints by MANDAIRE.

In the large orthopedic hospital at Berck-sur-mer, CALOT offers special diagnostic and therapeutic courses during the summer months.

Oto-rhino-laryngology. The University clinic is located at Hôpital Lariboisière, under the direction of SEBILEAU. There is a large ward and out-patient service, and in addition to the routine work of the clinics special courses are given upon request.

PATHOLOGY¹

The term Pathology is here used to comprise morbid anatomy, bacteriology, and hygiene.

General Courses. In the University of Paris certain courses in the regular curriculum belong properly to the field of Pathology. They are briefly as follows: a course in general pathology, by CASTAIGNE; a course in pathological anatomy, by Pierre MARIE, assisted by ROUSSY; a course in the history of medicine and surgery, by LETULLE; a course in hygiene, by CHANTEMESSE; and a course in experimental and comparative pathology, by ROGER. These courses are accompanied by practical laboratory work.

Other courses are given in Paris in institutes affiliated with the University. Among such courses are those in bacteriology and hematological technic, by ROGER; in parasitology, by BLANCHARD; and in tropical pathology and hygiene, by WÜRTZ; all given at the Institute of Colonial Medicine (Institut de Médecine coloniale). Completion of the course in colonial medicine in this institution entitles the graduate to a special diploma in the subject, given by the University of Paris (Diplôme de Médecine coloniale).

The course in Medical Microbiology, given each year at the Pasteur Institute in Paris from November 15th to March 15th, is perhaps the most famous, complete, and practical course in this subject given anywhere in the world. It is offered by the division of microbiology under the direction of ROUX and with the immediate

¹ [Drafting Committee: F. P. GAY, University of California.—Ed.]



FRANÇOIS XAVIER BICHAT (1771-1802)

MEDICINE: PATHOLOGY

laboratory supervision of BORREL, NICOLLE, and others. Completion of satisfactory work in this course leads to a certificate from the Institute (Certificat de présence et d'études).

Special Research. Opportunities for advanced study of special problems are afforded in the University laboratories in pathology, hygiene, and also particularly in connection with the various hospitals which are affiliated with the University. It is sufficient comment on the true investigative spirit of the French to note that these opportunities are not listed in their catalogues. They depend on the particular desire of a graduate student to do some definite piece of work, and on the attraction of some particular man's name or personality to decide him where that work shall be done. Graduate study is represented by no definite curriculum and by a reward in the shape of a diploma in its initial phases only. True graduate study, even in medicine, consists essentially in the personal stimulation of some particular master and the intensive study of some specialty or the investigation of some particular problem.

The practical aspects of pathological research, in its bearing on clinical diagnosis, are well exemplified in Paris, where many able practitioners are also pathologists of note. Men like Maurice LETULLE and NATTAN-LARRIER may be mentioned in this connection.

The opportunities for advanced scientific research in Paris are more specifically available in connection with the Pasteur Institute. This institute is divided into several services which deal in turn with the practical applications in preventive and curative medicine, particularly in relation to the infectious diseases. There is a clinic for the preventive treatment of rabies, under the direction of CHAILLON and VIALA, and a service of serum therapy under the direction of MARTIN with the

assistance of DOPTER. These two services include the Pasteur Hospital for the treatment of those infectious diseases which the Institute has studied or is studying. In addition to these more practical applications of the scientific advances in pathology is the service of scientific research (Service de Recherches scientifiques) so-called, formerly under the direction of the late Élie METCHNIKOFF, and including such men as BESREDKA, BURNET, DUJARDIN-BEAUMETZ, and LEVADITI. There is also the service of colonial microbiology (Microbiologie coloniale) with LAVERAN and MESNIL. The mention of these names alone is sufficient to indicate the type of original investigation that is going on, and in which properly accredited investigators may participate for a nominal fee to pay the expense of material.

Space permits no extended reference to the general medical curriculum in the universities of France outside of Paris. As examples of more advanced work certain men may be mentioned in connection with some of these universities, as for example: RODET in Montpellier, COURMONT in Lyon, and particularly CALMETTE in Lille. Lille possesses, in addition to the university, a Pasteur Institute under the direction of CALMETTE, with whom are associated BRETON and GUÉRIN, whose work in occupational diseases and particularly in tuberculosis is well known.

PHILOLOGY
INCLUDING
CLASSICAL, ROMANCE, ORIENTAL,
SEMITIC, AND ENGLISH
PHILOLOGY

CLASSICAL PHILOLOGY

*LATIN*¹

The Renaissance had its birth in Italy, and Italy gives her name to the first period of classical scholarship. To the second, France gives hers. If we set aside ERASMUS, Dutch by birth, and LIPSIUS, Belgian, we may say that by far the commanding figures in Latin philology in the sixteenth century are the French scholars BUDÉ, who was the first important worker in Roman law and Roman coinage; Robert ESTIENNE, lexicographer and editor; MURET, TURNÈBE, and LAMBIN, critics and editors; CASAUBON, editor, and founder of the study of ancient life; PITHOU, editor, and active collector of manuscripts; and SCALIGER the younger, the greatest scholar of his time,—critic, editor, epigraphist, numismatist, and chronologist.

In the seventeenth century the lead was taken by the English and the Dutch. Nevertheless, France produced three notable scholars: SAUMAISE, text critic and commentator; DU CANGE, lexicographer of mediæval Latin; and MABILLON, who, at the instance of the Benedictine order, set himself especially to the study of the methods of determining the genuineness of manuscripts and their dates. From the resulting work, "*De Re Diplomatica*," sprang the science of Latin palaeography.

The love of Latin studies persisted in the eighteenth century in France with undiminished vigor, but without

¹ [Drafting Committee: WM. GARDNER HALE, University of Chicago; E. K. RAND, Harvard University.—ED.]

noteworthy originality, except in the case of MONTFAUCON, who endeavored to present antiquity visually to the modern reader by the publication of drawings of ancient monuments ("Antiquité appliquée et représentée en figures").

In the latter part of the eighteenth century Germany took the lead, under the influence of WOLF, the founder of modern philology. About the middle of the nineteenth century, modern philology became a possession of all nations. France took her part, attaining in the latter part of the century the high rank which she now holds, with certain distinguished and precious characteristics of her own. Her rise to eminence was gradual.

Beginning in 1837, QUICHERAT put forth work of high importance in his treatise on Latin versification, his lexicon of Latin poetry, and his edition of the Latin lexicographer and grammarian Nonius Marcellus. The middle of the century (to speak roughly) was characterized by admirable literary studies like those of NISARD on the Latin poets of the decadence (1834), the first important work of this peculiarly French type; of Constant MARTHA on the moralists of the Empire (1864) and on morals, religion, and science in the poem of Lucretius (1869); of PATIN on Latin poetry (1869); of BOISSIER (who continued his work into the present century) on Cicero and his friends (1865) and on Roman religion (1874); and the striking essays of TAINÉ on Livy (1856) and SAINTE-BEUVE on Virgil (1857). These two essays, the work of men primarily engaged in other fields, exemplify the exceptional sympathy with humanistic studies with which the French literary mind is generally endowed; and correspondingly the writings of professional Latinists in France, while marked by a penetrating precision, are characterized as a rule by an acute

and sensitive literary appreciation. The combination of these qualities in classical investigation is as important as it is rare.

The rise in France of the modern scientific spirit in Latin studies is due in good part (not to speak of scholars happily still living) to THUROT, who earnestly advocated the double ideal of literary appreciation and scientific method; to BENOIST, who urged the return to manuscripts in constituting a text, as against the acceptance of tradition; to WEIL, whose doctorate dissertation on the order of words in the ancient languages (1844) inaugurates the scientific study of the subject; and to a group of men of high achievement whose names bring us to the present century. Among these, special mention may be made of RIEMANN, syntacticist (whose premature death cannot be too much regretted); DELISLE, whose researches in palaeography and the history of mediaeval libraries have contributed greatly to our knowledge of the preservation and transmission of Latin texts; BRÉAL, comparative philologist, with a wide range in Latin philology, including the dialects, and the science of semantics, which he established and named; Victor HENRY, comparative philologist; ANTOINE, syntacticist; Émile JACOB, editor; DAREMBERG, who projected the "*Dictionnaire des Antiquités grecques et romaines*"; and SAGLIO, who was for many years its editor.

Among living workers now in retirement, Max BONNET demands special notice for his exhaustive book (1890) on the Latin of Gregory of Tours, important alike for Latin in its decadence and for the Romance languages in their origins; and for his study of the principal Paris manuscript of Catullus (1871), a work performed with a penetration and accuracy which were very rare at the time, and are not common now. And mention should

also be made of Émile THOMAS, author of many monographs and editions of classical authors (Cicero, Catullus, Petronius, Servius), and of a vivid presentation of Roman civilization under the early empire ("Rome et l'Empire aux deux premiers siècles de notre ère," 1897).

Instruction at the Universities. The remainder of our account concerns the men who are now teaching in universities or other institutions of similar rank. It is to be regretted that the limits of our task make it necessary to omit the names of a number of distinguished scholars who are not attached to any teaching body.

The attribution "Paris" is to be understood as covering the University of Paris (which includes the École Normale Supérieure), the Collège de France, the École Pratique des Hautes Études, and the École Nationale des Chartes. The teaching in these different institutions in Paris is to a large extent connected, and all of it will be available. The professors will be found to be cordial and generous of help in their dealings with their students. It may here be noted also that, outside of the teaching institutions, Paris and its neighborhood afford rich material for the advanced scholar in certain fields. The general reading room of the Bibliothèque Nationale contains a splendid working library for students of the classics and related subjects; while the Salle des Manuscrits, in the same building, has a smaller but generally sufficient collection of texts and works of reference, with the largest apparatus of catalogues of manuscripts anywhere to be found. The distinguished curator of manuscripts, Henri OMONT, is one of the most genial and helpful of librarians. Finally, the department of Greek and Roman Antiquities in the Louvre, and the Museum of Saint Germain, are extraordinarily rich in material that concerns the classical student; and their

curators (respectively HÉRON DE VILLEFOSSE and Salomon REINACH) are among the most eminent of specialists.

In addition to his specialized training, the student in a French university will be under the constant influence of admirable models of the art of exposition. Almost invariably the French lecturer, whatever his subject, handles it with a large and philosophical grasp, with an instinctive sense of organization, and with an animation and charm of manner not often matched in other countries.

The opportunities which Paris offers to the student of Latin are thus seen to be great. But it should also be understood that the faculties of the provincial universities contain many scholars of high ability and accomplishment.

In the following exhibition of the types of work prosecuted by French Latinists who are now engaged in teaching, names of leading scholars are selected, many that deserve mention being necessarily omitted. In the case of each one given, the prominent line or lines of activity, so far as publication shows, will be indicated by a statement or by the title of a book. But it should be borne in mind that many scholars for whom a technical specialty is mentioned work in the field of literary interpretation and criticism as well, and vice versa.

With allowance for these crossings of lines, the names are arranged under the order of the groups (1) literature and criticism, (2) grammar (sounds, inflexions, syntax, etc.), (3) metrics and prose rhythms, (4) palaeography, epigraphy, numismatics, (5) history, institutions, religion, antiquities, (6) topography, geography.

HAVET, of Paris, has worked in critical editing ("Plauti Amphitruo," 1895; "Notes critiques sur le texte de Festus," 1914), in versification, in the metrics of prose

("La prose métrique de Symmaque et les origines du *Cursus*," 1892), in pronunciation, in word-order, and in the principles of criticism ("*Manuel de critique verbale appliquée aux textes latins*," 1911). MONCEAUX, of Paris, has worked especially in the literary history of Christian Africa ("*Histoire littéraire de l'Afrique chrétienne*," 1901-12), and in the Christian epigraphy of Africa ("*Enquête sur l'épigraphie chrétienne d'Afrique*," in each number of the "*Revue Archéologique*" since 1903). LEJAY, of the Catholic Institute, Paris, has worked especially in Horace (the *Satires* were published in 1912, and the *Epistles* are now in hand), and in syntax ("*Le progrès de l'analyse dans la syntaxe latine*," 1909; several editions of Riemann's "*Syntaxe Latine*"), and is a constant contributor to the "*Revue de Philologie*," of which he is one of the editors. PLESSIS, of Paris, has published upon Latin poetry ("*La poésie latine*," 1909; *Études critiques sur Properce*," 1889), and upon versification ("*Traité de métrique grecque et latine*," 1889), and is now engaged upon the *Odes* and *Epodes* of Horace, complementing the work of LEJAY. GOELZER, of Paris, has worked especially in the characteristics of later Latin ("*Étude lexicographique et grammaticale de la latinité de Saint Jérôme*," 1884; "*Le latin de Saint Avit*," 1909), in Tacitus, and in comparative grammar ("*Grammaire comparée du grec et du latin*," 2 vols., 1897 and 1901, the most considerable work of its kind produced in France). Jules MARTHA, of Paris, has published upon Cicero ("*Brutus*," 1892; "*Comment Cicero est arrivé aux honneurs*," 1903).

CARTAUT, of Paris, has published upon Horace (the *Satires*, 1899), Tibullus and the authors of the *Corpus Tibullianum* (1909), the elegiac distich in Tibullus, Sulpicia, and Lygdamus (1911), Virgil and Lucretius. COURBAUD, of Paris, has published upon Cicero ("*De*

Oratore," I, 1905), and upon Horace ("Horace; sa vie et sa pensée à l'époque des épîtres," 1914). COLLIGNON, of Nancy, has published upon Petronius ("Étude sur Pétrone," 1892; "Pétrone en France," 1905). ERNOUT, of Lille, has published upon Lucretius (Book IV, introduction, text, translation, notes, 1915) and upon the vocabulary, syntax, and morphology of Latin ("Le parler de Préneste," 1905; "Morphologie historique du latin," 1914). LAFAYE, of Paris, has published upon Statius, upon Catullus, Ovid, Terence, and their Greek models ("Le modèle de Térence dans l'Hécyre," 1916), upon institutions and religion, and upon inscriptions. He is editor, with PORTIER, of the "Dictionnaire des antiquités grecques et romaines," and a large contributor to it. For his epigraphical work, see under Cagnat.

BORNECQUE, of Lille, has published upon Seneca Rhetor (text, translation, notes, 1902), upon the metrics of prose ("Les clausules métriques latines," 1907), and upon history ("Rome et les Romains," in collaboration with Dornet, 1912). FABIA, of Lyon, has published upon Caesar, the Prologues of Terence, Tacitus ("Les sources de Tacite dans les Histoires et les Annales," 1893; "Onomasticon Taciteum," 1900), and Roman history and institutions. DE LA VILLE DE MIRMONT, of Bordeaux, has published upon Livius Andronicus, Laevius, Ausonius, Ovid, Virgil, and early Latin poetry ("Études sur l'ancienne poésie latine," 1903). VALLETTE, of Rennes, has published upon Apuleius ("L'Apologie d'Apulée," 1908). CONSTANS, of Aix-Marseille, has published upon Sallust and Tacitus ("Études sur la langue de Tacite," 1893).

MACÉ, of Rennes, has published upon Suetonius and upon pronunciation ("Essai sur Suétone," 1900). DELARUELLE, of Toulouse, has published upon Cicero ("Étude critique sur le texte du De Divinatione," 1911). R. WALTZ, of Lyon, has published upon Seneca ("Seneca

de Otio," 1909; "La vie politique de Sénèque," 1916). DURAND, of Paris, has published upon Cicero ("La date du De Divinatione," 1903). THIAUCOURT, of Nancy, has published upon Cicero, St. Augustine, and Sallust ("Les Académiques de Cicéron et le Contra Academicos de Saint Augustin," 1903). LÉCRIVAIN, of Toulouse, has published on the *Historia Augusta* and on institutions ("Études sur l'histoire auguste," 1904). RAMAIN, of Montpellier, has published upon the use of the Codex Bezae in the restoration of the text of Terence (1904), and upon word-groups in the versification of the dramatic poets (1904).

MEILLET, of Paris, has worked over a wide range in the field of linguistics ("De quelques innovations de la déclinaison latine," 1906; "Linguistique," 1911; "Introduction à l'étude comparative des langues indo-européennes," 3rd ed., 1912; "L'Évolution des formes grammaticales," 1912). VENDRYES, of Paris, has worked in linguistics ("Recherches sur l'histoire et les effets de l'intensité initiale," 1902; "De Hibernicis vocabulis quae a Latina lingua origines duxerunt," 1902; "Sur l'hypothèse d'un futur en italoceltique," 1909). GAFFIOT, of Paris, has published especially upon syntax ("Le Subjonctif de subordination en latin," 1906; "Pour le vrai latin," 1909). MAROUZEAU, of Paris, has published upon forms, order, and syntax ("Sur la forme du passif parfait latin," 1909; "Place du pronom personnel sujet en latin," 1907; "L'Emploi du participe présent latin à l'époque républicaine," 1911). CHABERT, of Grenoble, has published especially upon syntax ("De Latinitate Marcelli in libro de Medicamentis," 1897; "Marcellus de Bordeaux et la syntaxe française," 1901.)

AUDOUIN, of Poitiers, has published upon inflexions and upon meters ("De la déclinaison dans les langues indo-européennes," 1898). GRAMMONT, of Montpellier,



ÉMILE CHATELAIN (1851-)

CLASSICAL PHILOLOGY

has published upon sounds ("La dissimilation consonnantique," 1895). VERNIER, of Besançon, has published on versification ("Sur un passage de l'Épître aux Pisons": "Horace et Boileau juges de l'ancienne versification," 1903).

CHATELAIN, of Paris, has published a long and important list of works in palaeography ("Paléographie des classiques latins; collection de fac-similés des principaux manuscrits," 1884-1900; "Introduction à la lecture des notes tironiennes," 1900; "Uncialis scriptura codicum Latinorum novis exemplis illustrata," 1901; "Les palimpsestes latins," 1905; "Lucretius, codex Vossianus quadratus," 1913). PROU, of Paris, has published upon palaeography ("Recueil de fac-similés d'écriture du v^e au xii^e siècle," 1904; "Manuel de paléographie latine et française," 3d ed., 1910). CAGNAT, of Paris, has worked in epigraphy, antiquities, history, chronology, geography. (The list of his publications is very long, including: "L'année épigraphique," 1888 to the present time, since 1900 in collaboration with Besnier; "Explorations épigraphiques et archéologiques en Tunisie," 1883-86; "Cours d'épigraphie latine," 4th ed., 1914; "Corpus Inscriptionum Lat. VIII, Supplementum," Pars I, in collaboration with J. Schmidt, 1891; Pars II, in collaboration with J. Schmidt, 1904; "Inscriptiones Graecae ad res Romanas pertinentes," Vol. I with Toutain and Jouguet, 1911, Vol. III with Lafaye, 1905; "Les bibliothèques municipales dans l'empire romain," 1906; "Carthage, Timgad, Tebessa, et les villes antiques de l'Afrique du Nord," 1909). JOUGUET, of Lille, has published in epigraphy (see under Cagnat above) and in history and institutions ("La vie municipale dans l'Égypte romaine," 1911; also "Papyrus de Théadelphie," 1911; "Supplément aux papyrus de Théadelphie," 1912). BABELON, of Paris, has worked especially in numismatics ("Traité

des monnaies grecques et romaines," 1901-; "Moneta," 1914). He is a large contributor to the "Dictionnaire des antiquités."

BOUCHÉ-LECLERCQ, of Paris, is engaged upon history and institutions ("République et empire," 1909; "L'Intolérance religieuse et la politique," 1911; "Manuel des institutions romaines," 1886). BLOCH, of Paris, has published upon history and institutions ("La plèbe romaine," 1911; "La république romaine," 1913). He has contributed many articles to the "Dictionnaire des antiquités." GSELL, of Paris, has published especially upon the history and archaeology of North Africa ("Algérie et Tunisie," 1911; "Atlas archéologique de l'Algérie," 1911; "Histoire ancienne de l'Afrique du Nord," 1913). AUDOLLENT, of Clermont, has published on institutions, inscriptions, and topography ("Defixionum tabellae quotquot innotuerunt," 1904; "Carthage romaine," 1901). BOXLER, of the Institut Catholique, Paris, has published on institutions ("Précis des institutions publiques de la Grèce et de Rome," 1903). TOUTAIN, of Paris, has worked especially in religion and epigraphy ("Les cultes paléens dans l'empire romain," 1907, 1911; "Études de mythologie et d'histoire des religions antiques," 1909; many articles in the "Dictionnaire des antiquités." For epigraphy, see under Cagnat). RENEL, of Lyons, has published on religion ("Cultes militaires de Rome," 1903; "Les religions de la Gaule avant le Christianisme," 1906; many articles in the "Dictionnaire des antiquités.") DEGERT, of the Institut Catholique, Toulouse, has published on moral ideas and characteristics ("Les idées morales de Cicéron," 1909). HÉRON DE VILLEFOSSE, of Paris, has published extensively on antiquities ("Le trésor de Boscoreale," 1899; "Crustae aut emblemata," 1903; "Deux inscriptions relatives à des généraux pompéiens," 1898).

BESNIER, of Caen, has worked especially in geography, topography, and epigraphy ("La géographie économique du Maroc dans l'antiquité," 1906; "L'île tiberine dans l'antiquité," 1902; "Lexique de géographie ancienne," 1914; "Recueil des inscriptions antiques du Maroc," 1904. See also under Cagnat).

GREEK¹

France in the early ages of the revival of Greek studies was the home of many noted scholars,— such as Robertus STEPHANUS, Henricus STEPHANUS (Robert and Henri Estienne), TURNÈBE, LAMBIN, MURET, MONTFAUCON, CASAUBON, and the two SCALIGERS. All of these men in modern esteem hold positions of unquestioned leadership, and much of their work has not been superseded or improved.

This heritage has passed to worthy heirs, and during the last century France has had many eminent Greek scholars. BOISSONADE was editor of many previously unpublished Greek writers; among his productions were twenty-four volumes in an annotated series of the Greek poets, five volumes of *Anecdota Graeca*; he is especially famous as being the first editor of the poet Babrius. BURNOUF was editor of a most valuable Greek Grammar; PATIN, author of a series of sympathetic and learned comments on the Greek Tragic poets; ALEXANDRE, editor of the Sibylline Oracles; LITTRÉ, famous both as a physician and a scholar, editor and translator of Hippocrates in ten volumes; MILLER, one of the most expert of palaeographers, and the editor of many works which had not been previously published; MARTIN, author of important works in Music, Astronomy, Geometry, and

¹[Drafting Committee: J. A. SCOTT, Northwestern University.—Ed.]

Anatomy; TANNERY, author of a standard work on Greek Science; DAREMBERG and SAGLIO, editors of the famous Dictionary of Antiquities; THUROT, one of the best interpreters of the works of Aristotle; WEIL, editor and commentator in many fields of Greek Language and Literature; C. LENORMANT and his son, F. LENORMANT, authors of works of the greatest importance on Numismatics, Sculpture, and Epigraphy. Such men as BURNOUF, DUMONT, REINACH, FOUCART, HOMOLLE, and HAUSSOULLIER, partly of this and partly of the preceding generation, are everywhere regarded as among the leading scholars and interpreters of Hellenic life and culture.

The grasp and productivity of some of these men passes belief; e.g., Salomon REINACH's published works up to 1914 amounted to over 60 volumes and nearly 3000 separate articles, and as he was not born until 1858 this means an average of one book every six months and an article every four days of his adult career.

The History of Greek Literature (five volumes of nearly 4000 pages) by Maurice and Alfred CROISER is the best that has been written in any language, showing not only broad and exact learning, but in particular a fine and sympathetic appreciation of the spirit of the Greeks.

BÉRARD, by his efforts to identify sites which had been regarded as purely mythical, and by his proofs of the great importance of a knowledge of geography in understanding early history, has created a new field of research.

PSICHARI is the recognized leader of those writers who are elevating the vernacular of Modern Greek to the dignity of a literary language, and who by their own productions are giving it a literature.

This list of conspicuous Hellenic scholars might be multiplied, since in every field of Greek studies a place



HENRI WEIL (1818-1901)

CLASSICAL PHILOLOGY

of eminence is held by one or more French scholars. The thing which stamps their learning with its own peculiar mark is literary appreciation and sanity, since few of the phantastic theories which have wasted and diverted sound scholarship originated in France.

Museums and Libraries. Paris, because of its valuable collections of many of the most important Greek manuscripts, its original works of Greek art, its unrivaled wealth in collections of inscriptions, and its immense libraries, offers to students of Greek life, history, literature, or language, facilities possessed by no other center of learning. This preëminence in original material has drawn to Paris most of the great scholars of France. Accordingly American students in Greek will find it to their advantage to begin, at least, their work in Paris; hence the work done in other parts of France will be passed by in this brief summary.

Courses. In Paris, courses in Palaeography and Epigraphy are given by HOLLEAUX, HOMOLLE, HAUSSOULLIER, and FOUCART. As the French conducted the important excavations at Delos and Delphi, an unprecedented wealth of material came into their possession, and most of the inscriptions thus found have been interpreted by these four scholars. Courses in Greek History and Geography are given by BÉRARD, BOUCHÉ-LECLERCQ, GLOTZ, and BABELON. Here too the abundance of original material has given these scholars peculiar advantages.

Courses in Greek Language and Literature are given by Maurice and Alfred CROISET, PUECH, GIRARD, BOURGUET, MAZON, JACOB, JOUGUET, SERRUYS, BRÉAL, DESROUSSEAUX, HAVET, and TOUTAIN. Even this list makes no reference to the courses in Greek Art, Greek Philosophy, Latin, Sanskrit, or to the many courses of great interest to Greek students in allied departments.

Periodicals. The following journals and periodicals, dealing entirely or in part with Greek, are published by French scholars: "Bulletin de correspondance hellénique"; "Revue archéologique"; "Revue critique"; "Revue de philologie"; "Revue des études grecques"; "Revue des études anciennes"; also many other periodicals of a more general nature which frequently contain articles of value on Greek subjects.

ROMANCE PHILOLOGY¹

The student of Neo-Latin naturally directs his steps to one of the Latin lands, and with double profit; for, although the honor of first placing Romance linguistics on a scientific basis was achieved by a German, F. C. DIEZ (1794-1876), and although Germany is still an abundant and able contributor, the countries that can now boast of the greatest number of truly eminent Romance scholars are Italy and France. Of these, France, with her concentration of intellectual life, offers the better facilities for study. From early times, Paris has been the center where the leading men of other Romance countries — princes, statesmen, scholars, and men of letters — have sought their education and received much of their best inspiration; and through them, of course, Parisian influence has reached the peoples from which they came. At the present day, Paris offers the student an unequalled opportunity to come into contact with cultivated and prominent representatives of the various Romance nations, and to learn to understand the spirit that animates them — that Latin genius which has already given the world three great civilizations, the Roman, the Neo-Latin culture of Europe, and the Hispanic civilization in America.

The essential unity of the principal Romance tongues was recognized by French scholarship as early as the

¹[Drafting Committee: C. H. GRANDGENT, Harvard University; H. R. LANG, Yale University; KENNETH MCKENZIE, University of Illinois; RAYMOND WEEKS, Columbia University.—ED.]

16th century, and notably by H. ESTIENNE, who found their source in popular rather than in literary Latin. To that century belongs also the first edition of the invaluable "Glossarium ad Scriptores mediae et infimae Latinitatis" by DU CANGE. Nevertheless, despite some lexicographical and speculative studies, Romance philology made little headway for some two hundred and fifty years. Then, between 1815 and 1845, appeared the stimulating works, "Grammaire romane," "Grammaire comparée des langues de l'Europe latine," "Lexique roman, ou Dictionnaire de la langue des troubadours," of F. J. M. RAYNOUARD, a pioneer who might have anticipated Diez, had he been more accurately schooled in phonology, and less dominated by a preconceived idea that mediaeval Provençal (or "Roman," as he called it) represented an intermediate stage between Latin and all the modern forms of Romance speech. His "Lexique," with a recent supplement by LEVY, is still the standard Old Provençal dictionary. The Old French vocabulary was industriously listed by F. GODEFROY in his "Dictionnaire de l'ancienne langue française" (1881-1902). Meanwhile (1872-79) E. LITTRÉ had published his historical "Dictionnaire de la langue française," a model for all subsequent lexicographers, and in particular for A. HATZFELD, A. DARMESTETER, and A. THOMAS, authors of the "Dictionnaire général de la langue française" (1890-1900), which marks a further progress in the treatment of etymology, semantics, and pronunciation.

For many years the most commanding figure in the Romance field, after the death of Diez, was his pupil, Gaston PARIS (1839-1903), who first came into prominence in 1861 with his "Étude sur le rôle de l'accent latin dans la langue française." Beside him stood A. DARMESTETER (1846-88), investigator of the formation and the life of words, and Paul MEYER, who with Paris

launched "Romania," the most famous vehicle of Romance studies. Their disciples, all over the world, were the teachers of the next generation. Among their contemporaries may be mentioned C. CHABANEAU, an authority on French and Provençal grammar; C. THUROT, who traced the development of French pronunciation; and M. BRÉAL, who, though not primarily a Neo-Latinist, did much to advance the study of the meanings of Romance words. The fruits of previous researches, and of his own, are embodied by F. BRUNOT in his vast and still unfinished "Histoire de la langue française des origines à 1900" (5 vols., 1906-13). Linguistic science adopted novel methods under the guidance of the Abbé ROUSSELOT, the founder of experimental phonetics, whose great publications began in 1891; and of J. GILLÉRON and E. EDMONT, compilers of that enormous storehouse of dialect material, the "Atlas linguistique de la France" (1902-13). Much had been already garnered in the "Revue des patois gallo-romans" (1887-92) and the "Bulletin de la Société des parlers de France" (1893-99); the former was continued by L. CLÉDAT's "Revue de philologie française." More general are "La Parole" (1889-) and the "Revue de dialectologie romane" (1909-). Brunot has in the Sorbonne building an important and growing collection of speech records known as the "Archives de la parole." The facts revealed by all these recent investigations have led to a new interpretation of dialect phenomena, exemplified, for instance, in "Les Aires morphologiques dans les parlers populaires du nord-ouest de l'Angoumois" (1914), by A. L. TERRACHER.

For the comprehensive study of mediaeval literature, the way was prepared, in the Renaissance and Neo-Classical periods, by the collection, description, and translation of manuscripts; and some important attempts

at collective presentation were made in the 16th century by Jehan de NOSTREDAME and Claude FAUCHET, in the 18th by MONTFAUCON and LA CURNE DE SAINTE-PALAYE. During the first half, and more, of the 19th century, literary scholars devoted themselves, for the most part, to the publication of the huge mass of documents preserved. Some, to be sure, by their general portrayal of the poetry of a bygone age, succeeded also in lending a romantic interest to mediaeval letters: RAYNOUARD gave the public not only the "Choix des poésies originales des troubadours" (1816-21), but also "Des Troubadours et des cours d'amour" (1817); FAURIEL wrote an admirable "Histoire de la poésie provençale" (1846); Paulin PARIS is remembered both for "Les Manuscrits français de la Bibliothèque du Roi" (1836-48), and for "Les Romans de la Table Ronde mis en nouveau langage" (1868-77); LÉON GAUTIER attempted a great treatise on "Les Épopées françaises" (1865-68). The task of synthesis and systematic investigation was, however, reserved in the main for the latter part of the century. Here once more we find the insight, the charm, the enthusiasm of Gaston PARIS and the keenness and indefatigable zeal of Paul MEYER. Among the works of the former, the best known are the "Histoire poétique de Charlemagne" (1865); "La Littérature Française au moyen âge" (1888), "François Villon" (1901); to the latter are due the "Recherches sur l'épopée française" (1867), "Les derniers troubadours de la Provence" (1871), "Alexandre le Grand dans la littérature française du moyen âge" (1886). Two of the many distinguished pupils of Gaston Paris, A. JEANROY and J. BÉDIER, have given an entirely new turn to our conception of the course respectively of lyric and of epic poetry. Mediaeval life and learning have been interestingly investigated by C. V. LANGLOIS; the stage, by E. LINTILHAC. The

printing of texts has been continued by the "Société des anciens textes français," founded in 1876. Provençal is represented by the "Bibliothèque méridionale" and the "Annales du Midi" (1889-).

As to the historical and critical study of modern French literature, its glorious career, from VILLEMALIN to LANSON, is too familiar to require specification. It is enough to recall such names as SAINT-BEUVE, TAINÉ, RENAN, SCHÉLER, BRUNETIÈRE, LEMAITRE, FAGUET. Aside from the more popular magazines, some of the principal journals today are the "Revue d'histoire littéraire de la France" (1894-), the "Revue du seizième siècle" (1913-, succeeding the "Revue des études rabelaisiennes," 1903-12), the "Revue du dix-huitième siècle" (1913-). The study of letters from the comparative standpoint — first emphasized by Madame de STAËL — has been successfully pursued of late by J. TEXTE, E. BOUVY, F. BALDENSBERGER, E. PICOT, E. ESTÈVE, P. HAZARD, E. HAUMANT, J. VIANEY, E. MARTINENCHE.

Italian and Spanish studies, too, have flourished for a hundred years. The nine volumes of P. L. GINGUENÉ's "Histoire littéraire d'Italie (1811-19), A. F. OZANAM's masterly treatises on "Dante et la philosophie catholique au XIII^e siècle" (1839) and "Les Poètes franciscains en Italie" (1852); and the two posthumous volumes of Claude FAURIEL, on "Dante et les origines de la langue et de la littérature italiennes" (1854), were followed by a procession of authoritative works on the history, art, music, and letters of Italy. Especially noteworthy, for the literary side, are the researches of E. GEBHART on the Renaissance, the mystics, and the story-writers; those of C. DEJOB on the influence of religious ideas; and those of E. PICOT on the relations between France and Italy in the 16th century; the books on Petrarch by A. MÉZIÈRES, P. de NOLHAC, H. COCHIN, and J. VIANEY;

A. THOMAS's "Francesco da Barberino et la littérature provençale en Italie au moyen âge" (1883); P. SABATIER's "Saint François d'Assise" (1894); H. HAUVETTE's "Luigi Alamanni" (1903), "Dante" (1911), and "Boccace" (1914); A. JEANROY's "Carducci" (1911); and P. HAZARD's "Leopardi" (1913). An excellent summary is HAUVETTE's "Littérature italienne" (1906). The publication of investigations is facilitated by the "Bulletin italien," started in 1901.

Spain, after having been revealed to France, in the first half of the century, by such men of letters as Prosper MÉRIMÉE, Emile DESCHAMPS, and Théophile GAUTIER, by translators like DAMAS-HINARD, and by scholars of the standing of L. VIARDOT, F. DENIS, and P. CHASLES, was assiduously cultivated under the Second Empire by A. de LATOUR, T. de PUYMAIGRE, E. LAFOND ("Lope de Vega"), E. CHASLES ("Cervantes"), P. ROUSSELOT ("Les Mystiques"). In our time the most distinguished names are those of A. MOREL-FATIO, editor, with E. MÉRIMÉE and P. PARIS, of the "Bulletin hispanique," and R. FOULCHÉ-DELBOSC, editor of the "Revue hispanique" and director of the "Biblioteca hispanica." With them may be chosen for mention J. CORNU, L. de VIEL-CASTEL, E. MÉRIMÉE, and L. P. THOMAS, students respectively of the Cid, the theater, Quevedo, and preciosity. E. MARTINENCHE has treated of the influence of the Spanish drama on the French. Compared with France, the Teutonic countries have at present few students of Hispanic speech and letters, and none of great authority. In conclusion, it may be recalled that two of the most important Spanish texts, the "Cronica rimada del Cid" and the "Cancionero general" of 1554, were printed in France (in 1846 and 1878), and that Paris was the seat of publication of the sixty volumes of the "Coleccion de los mejores autores españoles"

(1845-72). The Bibliothèque Nationale and the Parisian bookshops are particularly rich in Spanish manuscripts and printed books.

Instruction at Paris. To the Romance student of today, Paris presents not only the resources of the Sorbonne, which contains the Faculté des Lettres, the École des Hautes Études, and the École des Chartes, but likewise those of the Collège de France, across the street. Some Americans may be attracted also by the Normal Schools, or by the National Conservatory, which are open to foreigners under specified conditions. Many will certainly take advantage of the special French instruction offered to foreigners by the Comité de Patronage des étudiants étrangers de la Faculté des Lettres (November to May), by the Alliance Française, 186 Boulevard St. Germain (one group of courses in July, one in August), and by the Guilde Internationale, 6 rue de la Sorbonne (one set of courses during the school year, another from July to September). In addition to the collections of books and records in the Sorbonne building, the student has at his disposal the Bibliothèque Nationale, the Bibliothèque de l'Arsenal, the Bibliothèque Sainte-Geneviève, the Bibliothèque Mazarine, not to mention the Bibliothèque Historique de la Ville de Paris and various other special libraries. At 11 rue Mazarin is an information bureau for students of Romance Philology; at 96 boulevard Raspail, a Centre d'Études Franco-Hispaniques.

In the *Faculté des Lettres* the history of the French language is expounded especially by F. BRUNOT (author of "La Doctrine de Malherbe," 1891; "Histoire de la langue française des origines à 1900," 1906); French literature and bibliography, by G. LANSON (editor of Racine, Sainte-Beuve, Voltaire; author of works on

Nivelle de la Chaussée, Bossuet, Boileau, Corneille; "Conseils sur l'art d'écrire," 1890; "Hommes et livres," 1895; "Histoire de la littérature française," 1895; "Manuel bibliographique de la littérature française," 1909; "La Méthode de l'histoire littéraire," 1911; French and Provençal linguistics and mediaeval literature, by A. THOMAS ("Francesco de Barberino et la littérature provençale en Italie au moyen âge," 1883; "Essais de philologie française," 1902; "Mélanges d'étymologie française," 1902; "Nouveaux essais de philologie française," 1904; editor of Bertran de Born; former editor of "Romania," collaborator on the "Dictionnaire général de la langue française"); southern European literature, particularly Provençal, by A. JEANROY ("Les Origines de la poésie lyrique en France au moyen âge," 1889; "Carducci," 1911; "Les Joies du Gai Savoir," 1914; editor of Provençal texts); Italian, by H. HAU-
VETTE ("Luigi Alamanni" 1903; "Littérature italienne," 1906; "Dante," 1911; "Boccace," 1914); Spanish, by E. MARTINENCHE ("La Comédie espagnole en France de Hardy à Racine," 1900; "Molière et le théâtre espagnol," 1906); Rumanian, by M. ROQUES ("Le Garçon et l'aveugle, jeu du XIII^e siècle," 1911; author with J. Gilliéron of "Études de Géographie linguistique," 1912; editor and bibliographer of the works of Gaston Paris; editor of "Romania)." French literature may be studied also with F. STROWSKI ("Pascal et son temps," 1907-09; "Les Essais de Montaigne," 1906-09); H. CHAMARD (editor and biographer of Du Bellay); G. REYNIER (three volumes on the novel); G. MICHAUT (investigator of Sainte-Beuve, Sénancour, and La Fontaine); E. HUGUET ("La Syntaxe de Rabelais," 1894). Mediaeval French history is taught by F. LOT ("Les Derniers Carolingiens," 1891; Breton history, Hugh Capet, Charles the Bald).

At the *Collège de France*, Spanish literature is represented by A. MOREL-FATIO ("L'Espagne au XVI^e et au XVII^e siècle," 1878; "Calderon," 1882; "Études sur l'Espagne," 1888-1904; "Catalogue des manuscrits espagnols et des manuscrits portugais," 1892; "Le Théâtre espagnol," with L. Rouanet, 1900; "Ambrosio de Salazar," 1901; "El Libro de Alixandre," 1906; "Historiographie de Charles-Quint," 1913; editor of "Bulletin hispanique"); Renaissance and modern French literature, by A. LEFRANC ("Les Navigations de Pantagruel," 1905; "Calvin, l'Institution chrétienne," 1911; "Rabelais, Œuvres complètes," 1912-13; "A. Chénier, Œuvres inédites," 1914); mediaeval French literature, by J. BÉDIER ("Les Fabliaux," 1893; "Le Roman de Tristan et Iseult traduit et restauré," 1900; "Études critiques," 1903; "Les Légendes épiques," 1908-13). The Neo-Latinist can here follow also with profit the Latin instruction of L. HAVET ("La Prose métrique de Symmaque et les origines du Cursus," 1892; "Phaedri Fabulae," 1895; "Manuel de critique verbale," 1911), and the Celtic courses of J. LOT (best known to Romance scholars for his translation of the "Mabinogion," 1899 and 1913, and for his "Contributions à l'étude des romans de la Table ronde," 1912).

Advanced studies may be pursued at the *École des Hautes Études* under the direction of some of the men above mentioned (Thomas, Morel-Fatio, Jeanroy, Roques, Havet, Lot), of J. GILLIÉRON ("Le Patois de la commune de Vionnaz," 1880; "Atlas linguistique de la France," with E. Edmont, 1902-13; "Études de géographie linguistique," with M. Roques, 1912), for dialectology; of H. GAI DOZ in Celtic ("Études de mythologie gauloise," 1886; works on folk-lore and mythology); and of J. MAROUZEAU, in Latin ("La Phrase à verbe 'être' en latin," 1910). At the *École des Chartes* there are

general courses in French and Provençal philology and in palaeography. The Institut Catholique, 74 rue de Vaugirard, offers, in addition to courses in literature, history, and palaeography, an exceptional opportunity for the study of experimental phonetics and linguistic science under the Abbé ROUSSELOT (author of "Les Modifications phonétiques du langage étudiées dans le patois d'une famille de Cellefrouin," 1891, and of the "Principes de phonétique expérimentale," 1897-1908).

Instruction at Other Universities. Copious as are the resources of Paris, some Americans may well prefer the quiet, inexpensive life of the provincial universities, among which the following are to be recommended for Romance studies: Bordeaux, Montpellier, Lyon, Toulouse, Grenoble, Rennes, Caen. All of these have introduced, beside their regular courses, special instruction for foreigners; and all have organized committees or offices to minister to the particular needs of visitors from other countries. Grenoble has devoted much care to the housing of strangers, with a view to hygiene, economy, and practice in speaking French. At Bordeaux there is a *Maison des étudiants*. Toulouse has a Stadium for athletic sports. Several of the provincial universities have developed summer schools for foreign pupils: the most flourishing is that of Grenoble, noted for its excellent administration, its unusual facilities for the study of phonetics, and its situation in the midst of mountain scenery; that of Rennes, which is held at St. Malo, combines good teaching with the attractions of seashore. For the regular winter work, the opportunities presented by the several institutions are listed below:

Bordeaux.—Romance philology and the speech and letters of southwestern France, under E. BOURCIEZ ("Les Mœurs polies et la littérature de cour sous Henri



CAMILLE CHABANEAU (1831-1909)

II," 1886; "Précis de phonétique française," 1900; "Eléments de linguistique romane," 1910); Modern French literature, with A. LE BRETON (studies on the novel in the last three centuries, 1890-1901; "Balzac, l'homme et l'œuvre," 1905; "La Comédie Humaine de Saint-Simon," 1914); Italian literature, with E. BOUVY ("Voltaire et l'Italie," 1898); Spanish, with G. CIROT (contributor to the "Bulletin hispanique"), and H. COLLET ("Le mysticisme musical espagnol au XV^e siècle," 1913).

Caen.—French literature, under M. SOURIAU ("Bernardin de Saint Pierre," 1915), and P. VILLEY ("Les Sources et l'évolution des Essais de Montaigne," 1908).

Grenoble.—Phonetics and philology, with T. ROSSET, director of the Institut de Phonétique ("Les Origines de la prononciation moderne étudiées au XVII^e siècle," 1911; "Recherches expérimentales pour l'inscription de la voix parlée," 1911); French literature, with P. MORILLOT ("Scarron et le genre burlesque," 1888). Italian language and literature.

Lyon.—French philology, under L. CLÉDAT (editor of the "Revue de philologie française"; "Du Rôle historique de Bertrand de Born," 1879; "Grammaire raisonnée de la langue française," 1894; a Dictionnaire étymologique de la langue française," 1912). Courses in modern French literature and in Italian.

Montpellier.—Comparative philology, under M. GRAMMONT ("La Dissimilation consonantique," 1895; "Le Vers français," 1913). French literature, with J. VIANEY, ("Mathurin Regnier," 1896; "Le Pétrarquisme en France au XVI^e siècle," 1909), and J. MERLANT ("Le Roman personnel de Rousseau à Fromentin," 1905; "De Montaigne à Vauvenarques," 1914). Instruction in Romance philology, Spanish, and Italian.

Rennes.—French literature, with G. ALLAIS ("Montaigne et ses lectures," 1885; "Malherbe et la poésie

française à la fin du XVIe siècle," 1892; "Les Débuts dramatiques de Victor Hugo", 1903). French literature and Breton folklore, under A. LE BRAZ ("La Chanson de la Bretagne," 1892 and 1901; "La Légende de la mort chez les Bretons armoricains," 1893 and 1902; "Au Pays des pardons," 1904; "Au Pays d'exil de Chateaubriand," 1909). Celtic and Romance philology.

Toulouse.—Provençal, under J. ANGLADE ("Le Troubadour Guiraut Riquier," 1905; "Les Troubadours," 1908). Spanish, with E. MÉRIMÉE ("Quevedo," 1886). Modern French literature.

ORIENTAL PHILOLOGY¹

The beginnings of modern comparative grammar date from the studies of the Englishman, Sir William JONES, and the Germans, BOPP and GRIMM. The translation into French by Michel BRÉAL of Bopp's great systematic work on Indo-European grammar gave a distinct start and direction to linguistic studies in France. Previous investigators had dwelt mostly on the development of the forms of words and too little on that of their logical content. To the latter aspect of the growth of language Bréal's "*Essai de sémantique*" (1897) addresses itself, and — if it has not already done so — it seems destined yet to mark an epoch in the history of linguistics. Ferdinand DE SAUSSURE (1857-1913) taught for a decade at the *École des Hautes Études*, and his work, with that of Bréal, has had great influence upon French science. To continue the labors of Bréal and de Saussure, MEILLET was called to the *Collège de France*. His "*Introduction à l'étude comparative des langues indo-européennes*" shows how a rigorously scientific exposition is not incompatible with the grace of form and charming luminosity that are so characteristic of the French temperament. The work had already come to a third edition in 1912, and we may hope that a long career of continued usefulness still lies before it. Under his vigorous leadership have arisen pupils of promise and achievement: to mention only a few, — DOTTIN in Celtic, VENDRYES in

¹[Drafting Committee: FRANKLIN EDGERTON, University of Pennsylvania; E. W. HOPKINS, Yale University; C. R. LANMAN, Harvard University.—ED.]

Latin and Celtic, GAUTHIOT in the Baltic languages, CUNY in Greek, ERNOUT and MAROUZEAU in Latin, Jules BLOCH in the languages of India.

Indology. The mystical and theological speculations of Ancient India, as contained in the Upanishads, were first introduced to the Occident by ANQUETIL-DUPERRON, who went to the Orient as an employee of the East India Company. Without ever learning the sacred language of India, the Sanskrit, he studied the Upanishads in a Persian translation, and from that he made a Latin version which he published in 1801-02. CHÉZY, as professor of Sanskrit at the Collège de France, delivered his inaugural address on the use and value of that study in 1815. Fifteen years later he published the text of the masterpiece of the Hindu drama, Kalidasa's *Çakuntala*, in an edition which after almost a century is still used and respected. It contains not only the drama, but also the text of the epic form of the *Çakuntala*-story as it appears in the *Maha Bharata*, thus presenting the data for an interesting study in literary genetics.

Eugène BURNOUT (1801-1852) was the successor of Chézy at the Collège de France; in him were united a prodigious power of work, endless patience, scrupulous accuracy, and wonderful divinatory gift,—a combination amounting to nothing short of genius. Besides being a most eminent Sanskritist, Burnout was a pioneer in the sacred language of Buddhism, the Pali, and in Tibetan and Siamese and Burmese, and even in the language of the *Avesta*, the ancient texts of which he interpreted. His text and translation of the history of Krishna (the *Bhagavata Purana*) make three folios, magnificent, and yet so ponderous as hardly to be usable for every-day study. His "Introduction à l'histoire du Bouddhisme indien" is the first great Occidental work

on the religion of Buddha, and it was followed in 1852 by his "*Lotus de la bonne loi*," the first Occidental translation of an important Buddhist text, issued with a score of relevant learned memoirs. Burnouf made Paris the chief center for Indian studies and Indianists in the forties; and the power of his personality and teaching is shown by the fact that he drew to himself such famous pupils as Adolphe REGNIER and BARTHÉLEMY-SAINT-HILAIRE, GOLDSTÜCKER, Rudolf ROTH, and Max MÜLLER.

It is the times of bitterest trial for France that have witnessed some of the most notable events in the history of French Orientalism. Chézy's inaugural was delivered only a few months before the battle of Waterloo. The *École des Hautes Études* was opened in 1868. And it was only a little after the disasters of the Franco-German war of 1870-71 that a splendid trio of Indianists — SENART and BERGAIGNE and BARTH — arose to give luster to French scholarship. SENART, a native of Rheims, by his "*Grammar of Kaccayana*" (1871), laid a solid foundation for the further study of Pali, begun by Burnouf. The grammar was soon followed by his *Essay on the Legend of Buddha*. Many of the most important texts relating to this subject are contained in the *Maha Vastu*; Senart published an edition of this in three volumes (1882-1897) which may truly be called monumental. So also are his two volumes entitled "*Les inscriptions de Piyadasi*" or *Açoka* (about 250 B.C.), the "*Constantine of Buddhism*," containing very old and important data for the study of the palaeography and the linguistics of India and of its religious and political history.

Abel BERGAIGNE (1838-1888), pupil of a devoted teacher, HAUVETTE-BESNAULT, inaugurated the instruction in Indology at the Sorbonne, and founded a school

of Indianists who have kept up and advanced the noblest traditions of French science. His Vedic investigations — as laid down in his “*La Religion Védique d’après les hymnes du Rig-Veda*” (3 volumes, 1878–83, to which was added a fourth volume of indices by the American Indologist Maurice Bloomfield in 1897), “*Études sur le lexique du Rig-Veda*” (1884), “*Quarante hymnes du Rig-Veda traduits et commentés*” (1895), and in his numerous essays — touch not only the form and vocabulary of these venerable documents, but also their essential substance, and indicate what further products of his learning we might have expected, had not Bergaigne’s life been cut short untimely by a mountaineering accident in the French Alps.

A third great name which, with those of Senart and Bergaigne, came to high distinction in the seventies, is that of the Alsatian, Auguste BARTH (1834–1916), who for many years sent to the “*Revue critique d’Histoire et de Littérature*” contributions of such solid worth as to make him an authority of the highest standing in the world of scholars. Oral teaching from a professor’s chair was not feasible for him, on account of deafness, but he was in fact, to a host of younger men, a teacher, lovable, loved, respected, and followed. His “*Religions de l’Inde*” (1879; English ed., London, 1882; Russian ed., Moscow, 1896) traces the development of this mighty factor of Hindu life from the earliest Vedic times to those of modern reformers. The recognized importance of his results is due to the fact that they are drawn directly from the original sources, not taken at second hand. For Indianists, Barth was the court of highest appeal. His “*Bulletins*,” published from 1880 to 1902 in the “*Revue de l’Histoire des Religions*,” constitute at once a history of the progress of Indian studies and a wonderfully clear and convenient résumé of their



ÉMILE SENART (1847-)

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principal results. The modest form in which they appeared, as review-articles, is wholly out of keeping with their importance, and they have now been re-published, in two dignified volumes, as a part of his collected works. This is most fitting, for his judgments are so sound and well-reasoned as to be of enduring value.

It is not easy to lose sight of his "Inscriptions sanscrites du Cambodge" (1885), a monument to his skill and industry as an epigraphist, for it is an independent work; but his minor articles form an even greater testimonial to his vast and accurate learning and sound judgment, although they fail to give an adequate impression of their author's rare gifts, because it is hard to judge them as a whole, scattered as they are through some hundred and fifty volumes of a dozen different periodical publications. To the devotion of his colleagues, Senart, Foucher, and Finot, we owe the hope that these too will soon be published as part of his collected works.

Not only Bergaigne, but also his pupil Victor HENRY, another Alsatian, devoted much time and strength to the important task of making text-books. Bergaigne's "Manuel pour étudier la langue sanscrite" (texts, lexicon, grammar) has a host of admirably practical features; and so has Henry's "Éléments de sanscrit classique." The two in collaboration wrote also a hand-book for Vedic study. Henry's manual for Pali, and that of the Danish scholar Dines ANDERSEN, are the best at present available for the sacred language of Buddhism. Henry's interests and activities were very many-sided: he has left us two manuals of comparative grammar, excellent for brevity and avoidance of too great technicality; an austere treatise (in collaboration with the Dutch scholar CALAND) on the ritual (Agnishtoma); good literary

translations of Sanskrit works; and popular books on magic and on the literatures of India, etc.

The career of Sylvain LÉVI, both as investigator and as teacher, sheds luster upon his departed master, Bergaigne. His youthful work on the Hindu theater ("Le Théâtre indien," 1890) no one has even yet attempted to supplant. An elaborate treatise upon the doctrine of the sacrifice in the Brahmanas was doubtless suggested by his studies in that direction under Bergaigne; while for his work on Nepal ("Le Népal, étude historique d'un royaume hindou," 3 vols., 1905-8), the labors of the eager traveler are joined to those of the student of the written word. His text and translation of Asanga's Exposition of the Doctrines of the Greater Vehicle are a weighty contribution to Occidental knowledge of the Maha-Yana Buddhism. The Indian Miscellanies ("Mélanges d'indianisme," 1911) form a volume written by his pupils to celebrate his completion of twenty-five years of service as a teacher. Among the twenty-three contributors (to mention only a few) stand the names of FINOT, FOUCHER, LACÔTE, MEILLET, PELLIOT, VENDRYES,—men already distinguished for their achievements in archaeology and exploration, in the history of Buddhism and of literature, and in linguistics. The numerous and beautiful works of Foucher upon Buddhist archaeology, especially his volumes on the Greco-Buddhist art of Gandhara and on Buddhist iconography, are a revelation of the charm of Oriental study in its most fascinating aspects.

Sinology.—China and Chinese were made the object of scientific study by Frenchmen — Jesuit missionaries — almost two hundred years ago. Then, in 1815, Abel RÉMUSAT was made professor of Chinese at the Collège de France; and his successor, Stanislas JULIEN,



SYLVAIN LÉVI (1863-)

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who taught from 1832 to 1873, was the best Sinologist of his day. His translation of the life and travels of the illustrious Buddhist pilgrim, Hiouen Tshang, serves the Indianists much as Pausanias serves the Hellenists. Stagnating somewhat upon the death of Julien, French Sinology sprang to new life again in the hands of the Jesuit missionaries Père SÉRAPHIN-COUVREUR and Père WIEGER, and of CHAVANNES, CORDIER, and PELLLOT. Father COUVREUR's "Dictionnaire Chinois-français" (3rd ed., 1911) has been of inestimable value in promoting Chinese studies in France; and Father WIEGER's "Textes historiques" serve admirably for a general knowledge of the history of the Middle Kingdom. Henri CORDIER's "Bibliotheca Sinica" (2d ed., 1908) is the most minute and learned Occidental repertory of Chinese bibliography. Édouard CHAVANNES has published the first five volumes of his complete version of the "Mémoires historiques de Se-ma Ts'ien." Besides this vast historical work may be mentioned his archaeological investigations contained in his "Sculpture sur pierre en Chine" and in his "Mission archéologique dans la Chine septentrionale" (with nearly 500 plates). His three beautiful and charming volumes, "Cinq cents contes et apologues, extraits du Tripitaka chinois et traduits en français," have already been most fruitful in the hands of students of comparative literature.

The exploration of Central Asia by Sir Aurel STEIN, PELLLOT, and others, has opened up a new world to students of India and China. PELLLOT's finds in his journey of 1905-8 were astounding beyond measure. He visited the "Grottos of the Thousand Buddhas," examined the manuscripts (some fifteen to twenty thousand) which had been walled up in the eleventh century (mostly Chinese and Tibetan, but some in Indian writing), and brought to France material for the researches of scholars

for decades to come. In 1911 he was made professor of the languages and history and archaeology of Central Asia at the Collège de France.

Instruction.—Lectures for oriental students are numerous and are given in the Collège de France and at the Sorbonne. At the latter is located the École pratique des Hautes Études, which has a section devoted particularly to the science of religion. In addition to these three, there is a practical National School for Living Oriental languages (École spéciale des Langues orientales vivantes), where courses are given for three successive years in the modern languages of Arabia, Persia, China, Japan, Siam, Annam, India (Hindustani and Tamil), Armenia, Turkey, Russia, and Greece, with complementary courses (by CORDIER) on the history and legislation of Moslem races (in Morocco, Algeria, etc.). This school has a special library of 75000 volumes and numerous manuscripts and maps.

As an example of the wealth of instruction given in one year on Oriental subjects, the courses offered in 1914-1915 may be briefly enumerated. They are chiefly one-hour courses. In the Collège de France, MASPERO gave a course on Egyptian grammar and one on the religious and political crisis under Amenothès; FOSSEY, a course on Babylonian law; CLERMONT-GANNEAU, a course on Semitic epigraphy and antiquities; LODS, one course on Hebrew grammar and one on the history of Hebrew religion; CASANOVA, a course on the Koran and another on different forms of Islam; Sylvain LÉVI, one course on Indian literature and one on the Sikhs and Gurkhas; and CHAVANNES, one course on Chinese literature and one on Buddhism in China. There were also general courses on the archaeology of Central Asia, by PELLiot; on the languages and nations of the

Indo-Europeans, by MEILLET; and on the history of sacrifice by LOISY. A "public" course on the art of India, by FOUCHER, and one on comparative grammar, by VENDRYES, were supplemented by conferences intended to extend over several years; thus, for example, FOUCHER gave in the first year lectures on Sanskrit grammar, which were to be followed the next year by exercises in translation of Sanskrit text and during the following third and fourth years by the study of Vedic and Pali texts; and VENDRYES gave special courses on Irish, Gothic, and Old High German.

At the École Pratique des Hautes Études, following about the same order, we find HALÉVY offering three one-hour courses on Ethiopic (grammar and texts) and Turanian; SCHEIL, on Assyrian texts; BARTHÉLEMY, two courses, on Arabic texts and dialects; and LAMBERT three, on Hebrew and Syriac texts. LÉVI here offered one course on Sanskrit texts (reading one of Kalidasa's plays) and another on recent publications, his course being supplemented by BLOCH with a course on Bengali texts, and by BACOT with one on Tibetan texts. In Avestan, one course was offered by GAUTHIOT. For the near East, courses on Byzantine philology and history were given by DIEHL and PSICHARI. Courses were also offered by CLERMONT-GANNEAU, on Oriental antiquities (besides a special course on Hebrew archaeology), and by Isidore LÉVI, on Alexandrine literature and the History of Israel.

In the Section des Sciences religieuses, two courses were offered by GRANET (Chinese festivals and mourning texts); one on Babylonian and biblical myths, by FOSSEY; two on the cult of Israel and Ecclesiastes, by VERNES; one on Talmudic and Rabbinical Judaism, by Israel LÉVI; and two on the Koran and on Persian mysticism, by Clément HUART; while India was represented by two

courses (Upanishad and Buddhist texts) by FOUCHER, and Egypt by two, Egyptian Religion and Book of the Dead, by AMÉLINEAU.

Periodicals.— The periodicals published by French scholars on Oriental subjects, and appearing in Paris under the auspices of the University or the closely connected learned bodies whose members are University professors, are also worthy of notice. The "Journal Asiatique," published by the Société Asiatique, is the oldest and best; its contributors are mainly from the University. The "Mémoires de la Société de linguistique" and the "Bulletin de l'École française d'Extrême-Orient" are also valuable periodicals in their respective scientific and practical lines; while the "Journal des Savants," though more general in scope, is not less scientific. Under the care of the Musée Guimet appears the "Revue de l'histoire des religions," an invaluable aid to all workers in the field of comparative religion; while the "T'oung Pao," now in its eighteenth year, and the "Revue Sémitique," published by Halévy, are indispensable for the Sinologue and Semitic scholar.

Libraries.— Besides the general libraries of the College, the Sorbonne, and the Institute, the student of Orientalia has the Musée Guimet (7 Place d'Iéna), which contains 32000 volumes on the history and culture of the extreme Orient, and the Musée Indo-Chinois (Palais du Trocadéro), which contains a rich collection of Oriental antiquities. There is a special Salle de travail (Galerie Saint-Jacques) reserved for foreign students wishing to obtain the Certificat d'Études françaises.

SEMITIC PHILOLOGY¹

Interest in the Semitic languages has been a cherished tradition in France. As Abel Lefranc tells us in his valuable "*Histoire du Collège de France depuis ses origines jusqu'à la fin du premier empire*," this institution started with two professors of Hebrew, and another was added the next year. From that day to this, nearly four hundred years, instruction in Hebrew has been given continuously in this college. The diplomatic, religious, and commercial relations of France with North Africa and the Near East had been such that practical considerations early called attention to the importance of Arabic. It is true that not till 1587 do we find mention of an Arabic chair at the Collège de France (the incumbent of which was Arnoul DE L'ISLE); but nearly fifty years earlier, in 1538, the celebrated Guillaume POSTEL was appointed for "*l'enseignement des lettres grecques, hébraïques et arabiques*." It was a professor at the Collège de France, Antoine GALLAND, who early in the eighteenth century published his translation of the Arabian Nights. This work was not only one of great literary importance, but it has aroused and kept alive an interest in things Oriental to an extent difficult or impossible to estimate.

But it was not till the nineteenth century that great advances in Semitic philology were made. Napoleon's expedition stimulated interest in the Near East, while CHAMPOLLION'S discovery of the key to the Egyptian

¹[Drafting Committee: J. R. JEWETT, Harvard University; C. C. TORREY, Yale University.—ED.]

language not only was a great achievement in itself, but helped all Oriental learning. The decipherment of the cuneiform writing opened up new vistas in the world's history, and in this work French scholars took a splendid part. The names of LENORMANT, MÉNANT, Jules OPPERT, BOTTA, DE SAULCY, and others, are familiar wherever these languages are studied. The Crimean War and the French expedition to Syria in 1860 not only helped general interest in things Oriental, but the latter gave an opportunity to RENAN to make a journey not only to Phoenicia, but also to the Holy Land proper, results of which appear in some of those works which have made his name so famous. Meantime the genius of DE SACY (1758-1838) had aroused new interest in Arabic, and CAUSSIN DE PERCEVAL (1795-1871), QUATREMÈRE (1782-1857), and others, had done fine work in this field. The conquest of Algiers (1830-1847) had brought Islam to the very doors of France. The occupation of Tunis brought still more Moslems under French control; and with the acquisition of Morocco France has become a great Mohammedan power and must perforce give much study and attention to the Arabic language and to Islam.

In Archaeology, French scholars have done splendid work,—work in which they have had the intelligent and liberal support of the government. Some of the results of this work and this support are to be found, for example, in the magnificent collections of Oriental antiquities at the Louvre, in the Institut français d'archéologie orientale du Caire, and in such publications as the "*Mémoires publiés par les membres de la Mission archéologique au Caire*," those of the Institut français just mentioned, and above all in the magnificent "*Corpus Inscriptionum Semiticarum*."

Such well known names as those of DEFRÉMERY, SLANE, and Garcin DE TASSY (Arabic and Mohammedan



JEAN FRANÇOIS CHAMPOLLION (LE JEUNE) (1790-1832)

SEMITIC PHILOLOGY

science); MARTIN, DUVAL, and NAU (Syriac studies especially); DE VOGÜÉ, BERGER, and CHABOT (Epigraphy); Joseph and Hartwig DERENBOURG (Hebrew, Arabic, South Arabian and other studies); and THUREAU-DANGIN in the field of Old Babylonian science, may also receive mention here.

Instruction. Courses of interest to students of Semitic philology are given in the following institutions: Université de Paris; Collège de France; École pratique des Hautes Études; École spéciale des Langues Orientales vivantes; École du Louvre; École Coloniale; Institut Catholique de Paris; Cours de Langues vivantes.

It must suffice here to mention the men giving instruction in Semitic philology in the first three of these institutions, with a statement of the lectures or courses they have offered, and of the institution in which the instruction was given. The names of the instructors are arranged alphabetically, and in certain cases attention is called to some of their published works. The statement of courses is based on the "Livret de l'étudiant," 1914-15. Following the name of the instructor are, in order, the name of the institution, the title of his chair, and the subject of his courses.

BARTHÉLEMY (Adrien). École des Hautes Études. I. Classical Arabic. Interpretation of the Beyrouth Madjâni l'adab. II. Arabic Dialectology.

CASANOVA (Paul). Collège de France. *Arabic language and literature*. I. The schools and sects of Islam. II. Interpretation and critical study of the most ancient parts of the Coran. (Casanova is the author of "Mohammed et la fin du monde, étude critique sur l'Islam primitif," the first part of which was published in 1911; but much of his best work has appeared in the "Mémoires publiés par les membres de la mission

archéologique au Caire," and in those published by the Institut français d'archéologie orientale du Caire.)

CLERMONT-GANNEAU (Charles). Collège de France. *Semitic epigraphy and antiquities*. Study of various Semitic monuments and texts recently discovered.—Also, at the École des Hautes Études: *Oriental archaeology*. I. Oriental antiquities (Palestine, Phoenicia, Syria). II. Hebrew archaeology. (CLERMONT-GANNEAU has done so much valuable work in the field of oriental archaeology and has published so much that a complete bibliography would be a very long one. Perhaps it will suffice to mention here his "Archaeological Researches in Palestine," 1873-74; published for the Committee of the Palestine Exploration Fund, 2 vols., 1896 and 1899; also his great "Recueil d'archéologie orientale," of which seven full volumes and part of an eighth had appeared by 1907).

FOSSEY (Charles). Collège de France. *Assyrian Philology and archaeology*. Topics in Babylonian and Assyrian law.—École des Hautes Études. *Assyro-Babylonian religion*. Certain Babylonian and Biblical myths. (Among Fossey's works may be mentioned: "La magie assyrienne: étude suivie de textes magiques, transcrits, traduits et commentés," Paris, 1902; "Contribution au dictionnaire sumérien-assyrien, supplément à la Classified list de Brunnnow," Paris, 1905-7; "Manuel d'assyriologie, fouilles, écriture, langue, littérature, géographie, histoire, religion, institutions, art," Tome I, Paris, 1904.)

GRÉBAUT. Université de Paris. *Ancient History of the Peoples of the Orient*. The Egyptian conquests in Asia.

GSELL (Stéphane). Collège de France. *History of North Africa*. I. History of Carthage, constitution and administration of the Carthaginian Empire. II. Study of the ancient texts relative to the military operations in

Africa during the first and second Punic Wars. (Among GSELL's published works are: "Les monuments antiques de l'Algérie," 2 vols., Paris, 1901; "L'Algérie dans l'antiquité," Alger, 1903; "Histoire ancienne de l'Afrique du Nord," Paris, 1913.)

HALÉVY, J. École des Hautes Études. *Ethiopic-himyarite languages and Turanian languages*. I. Grammar of the Ethiopic language; Interpretation of texts. II. Interpretation of texts drawn from the "Corpus inscriptionum semiticarum." III. Turanian languages; Grammar; Interpretation of texts. (Among HALÉVY's published works are "Recherches Bibliques: l'histoire des origines d'après la Genèse," Paris, 1895-1907; "Mélanges d'épigraphie et d'archéologie sémitiques," Paris, 1874. In 1893 Halévy founded the "Revue Sémitique d'épigraphie et d'histoire ancienne," to the pages of which he has contributed very extensively.)

HUART (Clément). École des Hautes Études. *Islam and religions of Arabia*. I. Interpretation of the Coran (Chapter IV) with the aid of Tabari's commentary. II. Persian mysticism according to the Methnewi of Djelâl-ed-din Roumi. (Among HUART's works are: "A History of Arabic Literature," New York, 1903; "Histoire des Arabes," vols. I, II, Paris, 1912-13.)

LAMBERT (Mayer). École des Hautes Études. *Semitic languages*. I. Hebrew: Grammar, and the interpretation of the Book of Deuteronomy. II. Interpretation of the Book of Isaiah. III. Syriac: Outline of Syriac grammar; Interpretation of texts.

LE CHATELIER (Alfred). Collège de France. *Moslem sociology and sociography*. The Chadeliga in North Africa, their religious, political, and social rôle. (Among Le Chatelier's published works are: "Les confréries musulmanes du Hedjaz," Paris 1887; "L'Islam au XIX^e siècle," Paris, 1888. Some of his most valuable work

has been in connection with the "Revue du Monde Musulman;" the first number bears the date November, 1906, and he has been director from the beginning.)

LÉVI (Israël). École des Hautes Études. *Talmudic and Rabbinic Judaism*. I. The Rabbinic commentaries on the Psalms. II. The religious poems of Juda HaLevi.

LÉVY (Isidore). École des Hautes Études. *Ancient History of the Orient*. I. Researches in the Alexandrian literature. II. History of Israel.

LODS (A.). University of Paris. *History of the Hebrew religion*. I. The beginnings of Hebrew literature. II. The prophets of Israel and their time. III. Interpretation of texts. IV. Elements of Hebrew grammar.

LOISY (A.). Collège de France. *History of Religions*. I. The Epistle of St. Paul to the Galatians. II. General history of sacrifice. (Among Loisy's writings may be mentioned: "Les mythes babyloniens et les premiers chapitres de la Genèse", Paris, 1901; "L'évangile et l'église," 3d ed., 1904.)

SCHEIL (V.). École des Hautes Études. *Assyrian philology and antiquities*. I. Interpretation of texts. Critical examination of the translations attempted by the first decipherers. II. Deciphering of epistolary texts.

(Scheil has done so much valuable work that his name is familiar to every student of the cuneiform writings; beyond a reference to the texts which he edited for the "Mémoires de la Délégation en Perse," among them the Code of Hammurabi, it would be impracticable to enumerate here his numerous important publications.)

VERNES. École des Hautes Études. *Religions of Israel and of the western Semites*. I. Researches on the ancient organization of the clergy and of worship in Israel. II. Interpretation of Ecclesiastes. (Among VERNES' works may be mentioned: "Histoire des idées messianiques depuis Alexandre jusqu'à l'empereur

Adrien," Paris, 1874; "Du prétendu polythéisme des Hébreux; essai critique sur la religion du peuple d'Israël suivi d'un examen de l'authenticité des écrits prophétiques," Paris, 1891, 2 vols.).

Libraries and Museums. The following Libraries and Museums may be mentioned as having especial value for the student of Semitic philology and history. A detailed account of their several treasures worthy of mention is here impossible: *Libraries*: Bibliothèque de l'Alliance israélite; Bibliothèque d'Art et d'Archéologie; Bibliothèque du Collège de France; Bibliothèque de l'École des Hautes Études; Bibliothèque de l'École spéciale des Langues orientales vivantes; Bibliothèque de l'École normale israélite; Bibliothèque de l'École rabbinique centrale; Bibliothèque de l'Imprimerie Nationale; Bibliothèque de l'Institut Catholique; Bibliothèque de l'Institut de France; Bibliothèque Mazarine; Bibliothèque du Musée Guimet; Bibliothèque Nationale; Bibliothèque Sainte-Geneviève; Bibliothèque de la Société Asiatique; Bibliothèque de la Société biblique protestante. *Museums*: 1. Musée du Louvre; 2. Musée de la Bibliothèque Nationale; 3. Musée Guimet; 4. Musée monétaire.

ENGLISH PHILOLOGY¹

We all know TAINÉ'S "Histoire de la Littérature anglaise" which appeared in 1864. It has been translated into English, and it may be found, sometimes in an abbreviated form, on the shelves of every bookshop and among the bethumbed volumes of every library. This book, despite its impatience of detail, may by its astonishing vogue introduce us at once to some of the dominating characteristics of French scholarship. French scholars have a talent for popularizing great ideas in a distinguished way; and they are more profoundly interested in literature than in linguistics and grammar.

This is not saying that linguistic studies in English do not appear in France. We may mention, at random, DEROCQUIGNY, "A Contribution to the Study of the French Element in English," 1904; BARBEAU, "On Differences between the use of the Definite Article in the Bible and in the Speech of To-day," 1904; BIARD, "L'Article THE et les caractéristiques différentielles de son emploi," 1908; THOMAS, "On the Epic Verse of John Milton," 1901; and VERRIER, "Essai sur les principes de la métrique anglaise," 1909; but the French incline to regard such investigations as subsidiary to the study of literature.

Another history of English Literature, which is the work of the French Ambassador at Washington, and which is in the hands of every serious student of English

¹Drafting Committee: ARTHUR C. L. BROWN, Northwestern University; ROLLO W. BROWN, Wabash College; JOHN L. LOWES, Washington University.—Ed.

is JUSSELAND's "*Histoire littéraire du peuple anglais*." This book, which is also known in an English version, appeared in several volumes from 1895 to 1909. More thoroughly documented than the *History of Taine*, more historical in tone, more inclusive of different origins and influences, Jusserand's *History* illustrates by its clarity and charm the prevailing tendencies of French scholarship. Jusserand is the author of numerous other works relating to English literature, among which are: "*La vie nomade et les routes d'Angleterre au XIV^e Siècle*," 1884 (known in an enlarged English version as "*English Wayfaring Life in the Fourteenth Century*," 1891); "*Le Roman au temps de Shakespeare*," 1887; and "*Shakespeare en France sous l'ancien régime*," 1898.

French scholars of English have devoted the most of their energies to the modern period which begins with Wyatt and Surrey. Yet students who go abroad with a primary interest in the literature of mediaeval England can nowhere find more congenial surroundings for work than at the University of Paris, where the spirit of GASTON PARIS, the prince of mediaevalists, still lingers, and where the most eminent of his pupils, such men as JEANROY and BÉDIER, are publishing mediaeval studies that arouse the attention of the entire world of letters. LEGOUIS' "*Chaucer*," 1912, which in the English translation by Lailavoix has become a standard book of reference in our college courses in Chaucer, is an example of French work in the older period of English. A good specimen of a French thesis in this field is Miss SPURGEON'S "*Chaucer devant la critique en Angleterre et en France depuis son temps jusqu' à nos jours*," 1911.

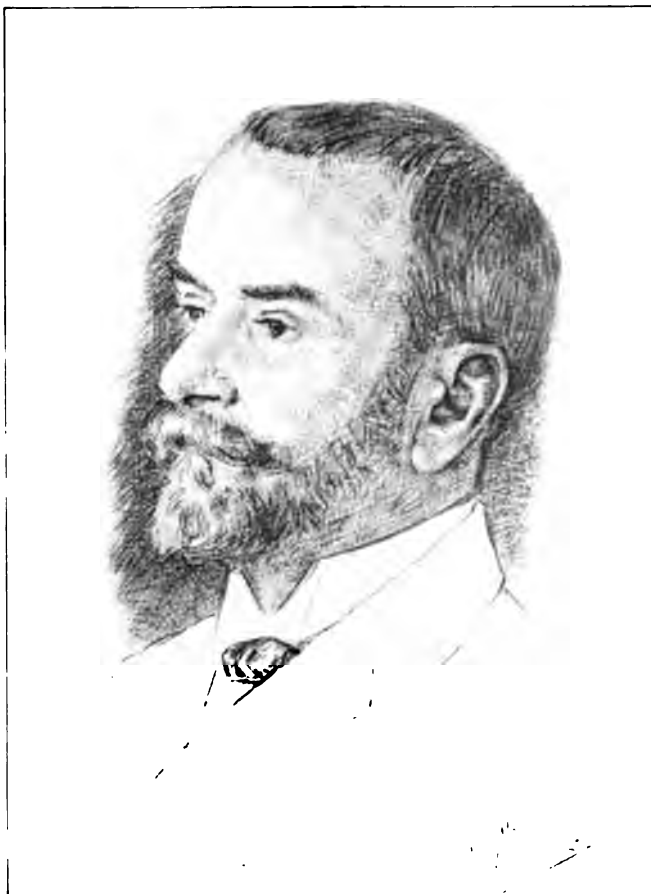
In literary criticism of the Modern English period, the French surpass every other foreign nation. It is advantageous for a student of English to learn to look at our literature sometimes from a foreign point of view,

and no foreigners have looked at English so steadily and so discerningly as have the French.

BELJAME, who till 1906 held in the University of Paris the chair of English which is now occupied by Legouis, began a new era in French criticism of English by the publication in 1881 of his "Le Public et les hommes de lettres en Angleterre au XVIII^e siècle." Other works dealing with a period or a movement have followed, for example: CAZAMIAN, "Le Romantisme social en Angleterre," 1904; BASTIDE, "John Locke, ses théories politiques et leur influence en Angleterre," 1906; GUYOT, "Le Socialisme et l'évolution de l'Angleterre contemporaine," 1913.

For the most part, however, French scholarship has turned to the study of individual authors. The first of these studies in date is STAPFER's "Laurence Sterne," 1870, and perhaps the most charming is ANGELLIER's "Robert Burns," 1893. Only a few others can be mentioned merely as examples: FEULLERAT (a scholar who is also known for his studies of English theatrical companies), "John Lyly," 1910; DELATTRE, "Robert Herrick," 1911; MOREL, "James Thomson," 1895; LEGOUIS, "La Jeunesse de W. Wordsworth," 1896; DEROCQUIGNY, "Charles Lamb," 1904; LAUVRIÈRE, "Edgar A. Poe," 1904; and DHALEINE, "Nathaniel Hawthorne, sa vie et ses oeuvres," 1905. These are books of an average length of five hundred pages, which represent from five to ten years' toil for the French "doctorat ès lettres." They display the most painstaking research combined with unusual skill in expression. In each of them the effort is to study the author's life as throwing light on his writings, and his writings, in turn, as illuminating his character.

HEDGCOCK's "David Garrick and his French friends," 1912, is an expansion of his thesis which was written at Paris. MASSECK's "Richard Jefferies: Étude d'une personnalité," 1913, is a good example of a thesis for the new



JEAN JULES JUSSERAND (1855-)

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"Doctorat de l'Université de Paris." Studies like these show how well French scholars have guarded their pupils from the pitfalls of inaccuracy and vagueness, and at the same time have stimulated them to sympathetic literary appreciation.

Instruction at the Universities. The student of English who goes to France will naturally establish himself at Paris. Here is the great library, the Bibliothèque Nationale, with its 3,000,000 volumes, and 110,000 manuscripts, and almost unlimited resources. Other libraries such as the Bibliothèque Mazarine, the Bibliothèque Sainte-Geneviève, the latter in the immediate neighborhood of the Sorbonne, may also interest him as convenient places for all ordinary researches. There is also of course, the library of the Sorbonne itself, with its "salle de travail" and numerous special collections.

In the Faculté des Lettres, LEGOUIS and CAZAMIAN lecture regularly on some special topic in English literature with appropriate "conférences" and exercises. In 1914-15 Legouis lectured on The Life and Work of Edmund Spenser, and Cazamian on Special Topics relating to the History of Civilization in England. Beside the works above mentioned, Cazamian has written, "Carlyle," 1913, and "L'Angleterre moderne, son évolution," 1914. HUCHON, author of "George Crabbe," 1907, also lectures on The History of the English Language and Its Anglo-Saxon Origins, with a "conférence" in which an Anglo-Saxon text is read.

The student of English will naturally take also courses relating to his special interests. If he is pursuing the comparative study of literature, he will follow the lectures of BALDENSBERGER, author of various books, as for example: "La Littérature, Création, Succès, Durée," 1913. If he is investigating the mediaeval field, he will hear

BÉDIER, renowned for his "Les Fabliaux," 1893, and "Les Légendes épiques," 1908-13, or JEANROY for his "Les Origines de la poésie lyrique en France au moyen âge," 1889. If he is a student of Celtic influences on English, he will hear LOTH, known for his "Les Mabinogion, traduits en français avec un commentaire explicatif," 1913, and GAIDOUZ, as the founder of "Mélusine" and the "Revue celtique." If he is interested in palaeography, he will be delighted by the unexampled facilities of the École des Chartes. If he has a turn for linguistics, he will hear THOMAS, one of the editors of the "Dictionnaire général de la langue française;" BRUNOT, who is writing the as yet unfinished "Histoire de la langue française des origines à 1900" (5 vols., 1906-13), and ROQUES, one of the authors of the "Etude de Géographie linguistique," 1912. If he is interested in the renaissance, he will follow the courses of LEFRANC, editor of "Calvin, l'Institution chrétienne," 1911, and of "Rabelais, Oeuvres complètes," 1912-13. If he inclines to the modern field, he will attend the lectures of LANSON, author of the "Histoire de la littérature française," 1895. Whatever his subsidiary interest may be, whether for example in History, or Spanish, or Italian, or mediaeval Latin, he will find these subjects expounded weekly by a master.

In the smaller universities of France, the chair of English is often occupied by a scholar of distinction. At Rennes, the professor of English is FEUILLERAT, and at Lille, DEROCQUIGNY; the writings of these men have already been mentioned. At Bordeaux, the professor of English is CESTRE, author of "Les Poètes anglais et la Révolution française," 1905; at Caen is BARBEAU, who wrote "Une Ville d'eau anglaise au XVIII^e Siècle," 1904; and at Poitiers is CASTELAIN, author of "La Vie et l'œuvre de Ben Jonson," 1906.

Although in the provincial universities instruction in English is not often carried into the higher branches, the serious student will be sure to find lectures on some subsidiary topic that will help him to understand the life and the literature of the past. At Bordeaux, for example, he may profit by the lectures of LE BRETON, author of "Le Roman au xvii^e Siècle," 1898, and "Balzac, l'homme et l'oeuvre," 1905. If he is interested in folklore, he may at Rennes hear the courses of DOTTIN, known for his "Manuel d'irlandais moyen," 1913, and of LE BRAZ, author of "La Légende de la mort chez les Bretons armoricains," 1893, and "Au Pays de pardons," 1894. It is worthy of note that numerous French scholars of literary eminence are unconnected with a university, but teach in a "lycée," as for example PELLISSIER, author of "Le Mouvement littéraire au xix^e Siècle," 1899; and "Le Mouvement littéraire contemporain," 1901.

PHILOSOPHY

PHILOSOPHY¹

"The rôle of France in the evolution of modern philosophy is perfectly clear: France has been the great initiator. Elsewhere as well there have appeared philosophers of genius; but nowhere has there been, as in France, an uninterrupted continuity of original philosophical creation." Does this claim of Bergson ("La Science française," I, 15) in behalf of French philosophy appear too sweeping? Yet even a slight survey of the course of French thought goes far towards justifying it. Not that French philosophers have always developed their ideas systematically and in detail; on the contrary they have shown a certain distrust of system-making, preferring instead to keep their ideas in close contact with the concrete problems of experience which suggested them. The happy result of this tendency is seen in the peculiarly intimate relation throughout French history between philosophy and the other main thought-currents of the day, literary and art criticism, social and political movements, religious reforms, scientific discoveries and achievements. Perhaps in no country as in France have the current philosophical ideas permeated and influenced the great mass of the people. No nation has lived so concretely its philosophy.

Two of the most fundamental but opposed methods and tendencies in all modern thought were initiated by Frenchmen. DESCARTES gave to modern rationalism its

¹ [Drafting Committee: R. B. PERRY, Harvard University; J. H. TUFTS, University of Chicago; C. B. VIBBERT, University of Michigan; R. M. WENLEY, University of Michigan.— Ed.]

method and main outlines; but he also left open a way of interpreting problems which, taken up and developed by PASCAL, has furnished the method for all succeeding anti-rationalistic and romantic philosophies. In the eighteenth century the ENCYCLOPAEDISTS, extending the method of Descartes to psychological, social, ethical and religious phenomena, sketched the outlines of all future materialism. At the same time ROUSSEAU, continuing the tradition of Pascal in his own unique way, inaugurated the romantic movement.

At the very beginning of the nineteenth century appear two thinkers whose ideas and methods of procedure were destined to develop into the two most opposed tendencies in French philosophy to-day. MAINE DE BIRAN, in his "Essai sur les fondements de la psychologie et sur ses rapports avec l'étude de la nature," 1812, re-affirmed the tendency, employed so successfully by Descartes, of making self-conscious analysis the basis for metaphysics. On the one hand, he attached himself to the Ideologists who continued the tradition of CONDILLAC's sensational psychology; but, on the other, he so deepened the scope of this psychology that he made it reveal the inner consciousness of man as a continually unfolding dynamic process in which the sense of effort is central and in which man's freedom is revealed. On the basis of this psychological analysis Maine de Biran suggested the possibilities of a spiritualistic interpretation not only of human nature but also of physical nature. This suggestion, taken up and developed by Victor COUSIN, Felix RAVAISSON, Jules LACHELIER, Émile BOUTROUX, Henri BERGSON, and others, has continued down to the present day as one of the most original strands of idealistic thought in the nineteenth century.

Unfortunately COUSIN mingled Maine de Biran's fruitful suggestions with diverse and incongruous elements



HENRI BERGSON (1859-)

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into a shallow Eclecticism, altogether too subservient to conservative political ends and the requirements of a school philosophy. RAVAISSON, on the contrary, in "De l'habitude" and "Rapport sur la philosophie en France au XIXe siècle," making full use of de Biran's method and ideas, but also drawing on Aristotle, Leibnitz, and Schelling, arrived at a comprehensive realistic spiritualism in which nature appears as a refraction or diminution of mind ("esprit"). Falling under the spell of Ravaisson but also profoundly influenced by Kant, whose thought he introduced into academic circles in France, LACHELIER, in "Du fondement de l'induction," "Étude sur le syllogisme," and "Psychologie et métaphysique," has demonstrated the necessity of subordinating ultimately physical causation and mechanism to final causation and teleology. Influenced alike by Ravaisson's doctrine of habit as the analogy most illuminating in interpreting the relation between the material and spiritual aspects of our experience and by Lachelier's criticism of the causal concept, BOUTROUX, in "De la contingence des lois de la nature," and "De l'idée de loi naturelle," sketches an evolutionary conception of the world in which laws, conceived on the analogy of habits, are contingent and ever in course of development.

In this same general current of tradition stands BERGSON. In a brilliant series of monographs, "Essai sur les données immédiates de la conscience," "Matière et mémoire," and "L'Évolution créatrice," he has attempted, on the one hand, to show the fallacy involved in the method of intellectual analysis and the inadequacy of the rational, mechanical interpretation of the world in which it inevitably issues; on the other hand, he has endeavored to display the fruitfulness of intuition as the method which can reveal the immediately given data which make up our concrete experience. On the basis of these data the

world discloses itself to us as a qualitative process of continuous change, unfolding itself after the manner of our innermost psychological life of which the very essence is time. Closely associated with this same tendency, though basing their conclusions more directly on a critical examination of the methods and results of science, are the three mathematicians, the late Henri POINCARÉ, Gaston MILHAUD, and Edouard LEROY. Milhaud and LeRoy have recently entered the ranks of professional philosophers.

In sharp contrast to this spiritualistic tendency in French thought is the current which is characterized, on the one hand, by the attempt to make the study of social relations the starting point for the solution of all philosophical problems; and, on the other hand, by its method, called Positivistic, which maintains that explanation consists in stating as accurately as possible the constant relations which are observed to hold between our sense-impressions, elimination having been made of all theories, hypotheses, or other intellectual interpretations. SAINT-SIMON in his "Réorganisation de la société européenne" and numerous other works emphasized the first phase of the movement. His pupil, Auguste COMTE, added to it the method, and thus became the founder of Positivism. The systematic application of this method to social relations in his great work, "Cours de philosophie positive," entitles Comte to the honor of founding the strict science of Sociology. The dominant idea in his doctrine of the classification of the sciences — that the sciences are arranged in a hierarchy of increasing complexity passing from mathematics to sociology, and that the subject matter of no science is reducible to the laws and principles of another — has become almost an axiom of subsequent thought.

If the positivistic method be interpreted broadly as a distrust of all metaphysics and as a demand to keep to

concrete problems, especially the problems of man's social and historical life, then is it possible to attach to this same tradition Ernest RENAN and Hippolyte TAINÉ. Not, however, that the standpoint of either of these original thinkers can be identified the one with the other or with orthodox Positivism. RENAN, in his "Dialogues et fragments philosophiques" and "L'Avenir de la science," supports the standpoint of scientific probabilism; while TAINÉ, in his famous work "De l'intelligence" unfolds and illustrates the method of intellectual analysis. Both Renan and Taine are quite as well, if not better, known for their great historical than for their philosophical works. (*Vide* Renan: "Les origines du Christianisme," "Histoire du peuple d'Israël," "Vie de Jésus;" Taine: "Histoire de la littérature anglaise" and "Les origines de la France contemporaine.")

Today the tradition of Positivism is represented by a very influential and closely organized school with an organ of its own, "L'Année sociologique." Émile DURKHEIM, the recognized leader of the school, has developed the method of its procedure in "Les règles de la méthode sociologique." This method has been carried out in a systematic and brilliant manner by DURKHEIM, in "De la division du travail," "Le suicide," "Les formes élémentaires de la vie religieuse" and other studies; by LÉVY-BRUHL, in "La morale et la science des mœurs" and "Les fonctions mentales dans les sociétés inférieures;" by C. BOUGLÉ in "Le régime des castes;" by H. HUBERT and M. MAUSS, in "Le sacrifice," "La magie," and other studies; by Fr. SIMIAND, in "Le salaire des ouvriers des mines;" by M. HALBWACHS in "La classe ouvrière et les niveaux de vie;" and by numerous others in the studies of "L'Année sociologique."

Aside from its spiritualistic and positivistic tendencies, French thought has shown its vigor and originality in

several other directions. Taking as his point of departure the philosophy of KANT but stressing especially the Critique of Practical Reason, Charles RENOUVIER worked his way out to a strictly independent standpoint in his "Essais de critique générale." He affirms the independence of the human person; he shows how freedom must be reintegrated in the very structure of the world. Among the thinkers who have attached themselves to this standpoint of Neo-Criticism are the late F. PILLON, for many years the editor of the organ founded by Renouvier, "L'Année philosophique"; the late O. HAMELIN; and L. DAURIAC.

Drawing his inspiration alike from the philosophy of Plato, which he so brilliantly expounded in his earlier years, and from the doctrine of evolution which made such a profound impression on French thought in the latter part of the nineteenth century, Alfred FOUILLÉE arrived at an evolutionary conception of the world which is both strictly rational and teleological. This evolution is mediated through what Fouillée has called "idées-forces," ideas which are at the same time activities tending to realize themselves. This doctrine he has set forth in "L'Évolution des idées-forces," "La psychologie des idées-forces," and numerous other works. His nephew, J. M. GUYAU, supported vigorously this same doctrine till his untimely death.

We have touched upon only a few of the more prominent and original currents in French thought in the nineteenth century which are still influential to-day. Limitation prevents us from more than mentioning several other tendencies. The profound movement in the philosophy of religion, generally known as Modernism, has been developed within very liberal Catholic circles mostly by French thinkers such as LOISY, Maurice BLONDEL, LABERTHONNIÈRE, E. LEROY, FONSÉGRIVE, WILBOIS, and

others. In Protestant circles Auguste SABATIER has originated a new and profound doctrine in his works: "Esquisse d'une philosophie de la religion d'après la psychologie et l'histoire" and "Les religions d'autorité et la religion de l'esprit." French scientists have always shown a veritable genius for developing the logic of their own methods and subjecting them to criticism. Within the last third of a century scientific logic and methodology has been almost completely transformed by the works of Claude BERNARD, Ant. COURNOT, Paul and Jules TANNERY, LECHALAS, COUTURAT, DUHEM, PICARD, PERRIN, BOREL, Pierre BOUTROUX, Henri and Lucien POINCARÉ, BLOCH, WINTER, MEYERSON, and many others. Highly important contributions have been made to the fields of ethics, aesthetics, history of philosophy, psychology and social philosophy.

Inadequate as such a brief sketch as this must be in even suggesting the full originality of French philosophical thought, still it must suffice, since the prospective student of philosophy in France is likely to be more interested in the actual organization of the courses in the French schools to-day than in the achievements of the past.

Instruction at the Universities. *Paris.* It is a trite statement that Paris is the intellectual center of France; yet so far at least as philosophy is concerned this is literally true. The courses at the Faculty of Letters of the University of Paris and at the Collège de France represent only a small portion of the entire philosophical activity of the capital. Outside the University teaching staff are many men prominent in the philosophical world: editors and staff-men of the various publications and men in private life, such as X. LÉON, H. BERR, P. GAULTIER, L. DAURIAC, R. BERTHELOT, L. WEBER, M. WINTER, Fr. PAULHAN, G. PALANTE; administrators of the educational system, such as L. LIARD, G. BELOT, J.

LACHELIER, E. BOUTROUX; teachers in lycées, collèges, private and technical schools, such as D. PARODI, FONSÉGRIVE, MALAPERT, BAZAILLOS, CRESSON, DUNAN, PIAT, SERTILLANGES, HALÉVY, LECHALAS. It is possible from time to time for the foreign student to come into direct contact with the thought of some of these men through the special courses arranged from year to year at the École des Hautes Études sociales and the Collège libre des Sciences sociales and through the discussions of the Société française de Philosophie. This latter society, founded in 1901, has become the great clearing-house for philosophical ideas in France. The hospitality of its meetings, held monthly from December to May, is not infrequently extended to foreigners through the courtesy of some member.

At the Collège de France and at the Sorbonne the greatest freedom is allowed the lecturers in the choice of the subjects which they treat; consequently no definite description of courses can be given. At the Collège de France BERGSON lectures twice a week, one hour presenting some phase of his own philosophy, the other hour expounding the work of some classical philosopher. During 1914-15 and 1915-6, LEROY of the Lycée Saint-Louis has been substituting for Bergson. He has been lecturing on the modern criticism of experimental science and its philosophical consequences, a theme which he brilliantly developed a few years ago in a series of studies in "La Revue de métaphysique et de morale," 1899-1901. IZOLET, who occupies the chair of Social Philosophy, usually treats of some phase of French social development in the eighteenth or nineteenth century. He is widely known for his work on "La cité moderne." Pierre JANET, perhaps the most distinguished representative of pathological psychology today, treats of a wide range of subjects within his field.

At the Faculty of Letters about a third of the courses are organized exclusively with reference to the requirements for obtaining the two French degrees, the "licence" and the "diplôme d'études supérieures," and for passing the competitive examination, known as the "agrégation," which aims at selecting teachers for the lycées and collèges. The rest of the courses cover an unlimited range of subjects. DELACROIX, the most distinguished representative of psychology of religion in France, usually deals with some phase of this subject. (*Vide* his "Essai sur le mysticisme spéculatif en Allemagne au XIVe siècle" and "Études d'histoire et de psychologie du mysticisme.") BRUNSCHVIG is best known for his study in Spinoza and his work on the logic of mathematics, "Les étapes de la philosophie mathématique." LALANDE always expounds some phase of the logic and methods of science. (*Vide* his "La dissolution opposée à l'évolution dans les sciences physiques et morales.") MILHAUD has made some remarkable contributions to the history, criticism, and logic of science in his "Essai sur les conditions et les limites de la certitude logique," "Le rationnel," and his two series of studies in the history of scientific thought. L. ROBIN has charge of the work in ancient philosophy, and F. PICAVET of the work in mediaeval philosophy. The former has produced two excellent studies in Plato: "Théorie platonicienne des idées et des nombres d'après Aristote" and "La théorie platonicienne de l'amour." The latter has written two of the most accurate and impartial histories of mediaeval philosophy and theology ever produced: "Esquisse d'une histoire générale et comparée des philosophies médiévales" and "Essais sur l'histoire générale et comparée des théologies et des philosophies médiévales." Of the achievements of DURKHEIM and two of his associates at the Sorbonne, LÉVY-BRUHL and

BOUGLÉ, we have already spoken. DURKHEIM occupies the combined chair of Education and Sociology, and usually presents courses along both of these lines. LÉVY-BRUHL always lectures on some aspect of the history of modern philosophy. BOUGLÉ holds the chair of Social Economy; in 1914-5 he treated the following subjects: "La formation du socialisme démocratique en France de 1830 à 1848" and "Recherches sur l'économie politique et la morale sociale." G. DUMAS, who fills the chair of Experimental Psychology, keeps closely to the French tradition of treating this subject from the pathological standpoint. He has written several notable works: "Le sourire," "La tristesse et la joie," "Psychologie de deux messies positivistes."

Other Universities. Though Paris offers a wealth of talent in philosophy both within and without the University which cannot be duplicated in any other center in France, still there is a large number of notable and original thinkers occupying chairs of philosophy in the other fifteen universities scattered throughout the country. Maurice BLONDEL became one of the initiators of the Modernistic movement through his famous work entitled "L'Action." At Bordeaux are BREHIER, who has written one of the best works on Schelling, and RUVSEN, who has produced some excellent studies in the history of philosophy, especially on Kant and Schopenhauer. Abel REY, at the University of Dijon, has vigorously championed the extreme mechanical standpoint of science in his two works: "L'Énergétique et le mécanisme" and "La théorie de la physique chez les physiciens contemporains." E. GOBLOT, at the University of Lyon, has done some very original work in the classification of the sciences. FOUCAULT, at the University of Montpellier, and BOURDON, at the University

of Rennes, are both well known for their investigations in psychology. (*Vide* Foucault: "La psychophysique" and "Le rêve"; Bourdon: "De l'expression des émotions et des tendances dans le langage.") P. SOURIAU, at the University of Nancy, has made very valuable contributions to the subject of aesthetics: "La rêverie esthétique," "La beauté rationnelle," and "La suggestion dans l'art." MAUXION and RIVAUD, at the University of Poitiers, have both contributed to the history of philosophy, the former by his works on Herbart, the latter by his work on Spinoza and his study in "Le problème du devenir et la notion de la matière, des origines jusqu'à Théophraste."

But these are only a few philosophers among many in the provincial universities whose achievements entitle them to special mention. This sketch can only be suggestive.

Since the work in all the French universities is highly co-ordinated under one central administration, there are no difficulties in passing from one university to another without loss of time, grade, or privileges. This makes it possible to seek out anywhere in France the representative of any line of work in which one may be interested and to pursue one's studies under his direction. If to the unusually varied and intense creative activity manifested by French philosophy today be added the very hospitable and generous attitude of the administration of philosophical studies toward foreigners, especially Americans, there would seem to be every reason why an increasing number of students from the United States should avail themselves of the opportunities which France offers.

PHYSICS

PHYSICS¹

Some forty years ago a young American physicist conceived, planned, and executed an experiment of unusual difficulty. He impressed upon a small electric charge a speed so great that this charge, while in motion, exhibited the magnetic properties of an ordinary electric current — a phenomenon of first importance. The manipulative skill required for this experiment was so great that more than one European physicist, attempting to repeat the process, failed. Most noteworthy of these failures was that of Crémieu, working under the auspices of the Sorbonne, with an equipment which left little to be desired. In the meantime (1900), the original work had been repeated and verified by another young American physicist, who was invited by the University of Paris to come to France and repeat the experiment in conjunction with Crémieu, in order that all doubt might be resolved and the facts of the case established. The invitation was accepted; the two men working together discovered the cause of Crémieu's negative results, and then wrote up their work in a joint paper (*Phys. Rev.*, 1903) which established, probably for all time, the original discovery.

This incident is mentioned merely as an illustration of that openness of mind, receptivity for new ideas, and love of truth which is thoroughly characteristic of the French man of science. It was this same attitude of mind

¹ [Drafting Committee: HENRY CREW, Northwestern University; A. A. MICHELSON, University of Chicago; W. C. SABINE, Harvard University.— Ed.]

which prompted the French to invite another American to Paris when they decided to determine the metre in terms of the wavelength of light.

A second characteristic of the French scholar is a quality of mind best described, in terms of his own language, as "clarté." It is that ability in clear exposition which comes only to him who has studied the matter profoundly. The lucidity of the French treatise is that of an author who has renounced every idea which he has not made thoroughly his own.

A third characteristic of the French investigator is of interest to every young man who is thinking of studying abroad, namely, his vivacious good humor, his lightness of touch, his cheerful, optimistic disposition. No one esteems these traits more highly than the man who works in a physcial laboratory.

The high originality which is typical of the French mind may, perhaps, be best illustrated by running briefly over a few of the contributions which this nation has made to some of the subdivisions of physics.

A backward glance at the literature of the world soon convinces one that the classics are not many in number. The mature student of any subject, indeed, finds the facts and phenomena multitudinous, while its principles may usually be counted upon the fingers of two hands. In like manner, one who considers the history of any science finds not many names of the first rank. The chief actors are few, but of these France has had a very large share.

If modern physics may be dated from the birth of NEWTON and the death of GALILEO (1642) — the time when HUYGENS, DESCARTES, PASCAL, and TORRICELLI were in their prime — and if one makes an inventory of fundamental ideas introduced during the nearly three centuries which have followed that date, the chances



ALFRED CORNU (1841-1902)

PHYSICS

are that he will be somewhat surprised at the rôle which the investigators of France have continuously played. For the features of a landscape upon which a people live are not more permanent than the intellectual character of that people.

As regards Mechanics: Father MERSENNE investigated the dynamics of vibrating strings as early as 1636 — six years before the birth of Newton. VARIGNON shares with Newton the credit of introducing the new dynamics — now called the Newtonian dynamics. His “Project” appeared in the same year with Newton’s “Principia” and quite independently of it.

Students of Mechanics can never forget the three brilliant contemporaries — D’ALEMBERT, LAGRANGE, and LAPLACE — who were living in Paris when Benjamin Franklin was there, so ably representing the American cause. A half century later POINSOT created our rotational dynamics; later this was followed by the experimental researches of FOUCAULT on the pendulum and gyrostat. Eminent contributions to the theory of elasticity and wave-motion came from POISSON and CAUCHY; work along the same line being carried on to-day by BOUSSINESQ and HADAMARD.

In the domain of vibrating bodies, the names of LAGRANGE, FOURIER, LISSAJOUS, and KOENIG at once come up. A distinct and important contribution to thermal science is recognized at the mention of each of the following men, CARNOT, CLAPEYRON, DULONG and PETIT, REGNAULT, BECQUEREL, POUILLET, AMAGAT, CHAPPUIS, GUILLAUME. The wave theory of light — the theory of transverse vibrations — was created and established largely by FRESNEL, ARAGO, CAUCHY, JAMIN, FIZEAU, FOUCAULT, CORNU, and MASCART.

Just as the quantitative side of Electrostatics was set forth by COULOMB, so the quantitative description

of Electromagnetism was first given by AMPÈRE, BIOT and SAVART. FOURIER's formulation of heat-conduction was early adapted by OHM to the case of electric conduction. GRAMME in 1876 sent to America two of his new generators, equipped with ring-armatures of his own design; these machines mark the beginning of a new era of large electric currents and of electrical transmission of power.

In the field of radioactivity, BECQUEREL and the CURIES are known even to the man on the street.

Instruction in the Universities. *Paris.* To-day this brilliant succession of investigators is continued, in the Faculté des Sciences of the University of Paris, by such productive scholars as BOUSSINESQ, who is lecturing on Heat Conduction; BOUTY, who offers courses on Thermodynamics; LIPPMANN, whose subject is announced as Electrocapillarity and Optics; and Mme. CURIE, whose topic is naturally Radioactivity. Still other courses in physics are offered by LEDUC, COTTON, ABRAHAM, and KOENIGS.

In the department of Mathematics, certain other lectures with a physical trend are given by APPELL, GUICHARD, DRACH, and others.

The astrophysical investigations of DESLANDRES in the observatory at Meudon are known to be of the highest order and along the same lines in which HALE in our own country has acquired eminence.

Many advanced students in physics will be interested in the opportunities for work along the closely related line of Physical Chemistry in which courses are offered by LE CHATELIER, URBAIN, and PERRIN. In the Collège de France, the work of LANGEVIN in experimental physics and HADAMARD in mathematical physics is well known in America.

Both at the Sorbonne and at the Collège de France the laboratory equipment is remarkably complete and quite available.

Other Universities. But the opportunities which France offers for higher work in Physics are not limited to Paris.

Along the western portion of the country lie the well known Universities of Rennes, Poitiers, and Bordeaux. At the first named institution, LE ROUX offers distinguished courses in Mechanics, pure and applied; at PORTIERS, one finds GARBE and TURPAIN, in Physics. DUHEM, whom the world has just lost, has made Bordeaux a familiar name in Physics everywhere. Here H. BÉNARD offers opportunities in general physics.

Among the many charms of Southern France are always to be included the three renowned universities at Toulouse, Montpellier, and Marseille. BOUASSE and COSSERAT, in Physics and Astronomy respectively, are among the leading men on the staff at Toulouse. MESLIN is in charge of Physics at Montpellier. Some American students, whose work is now well known, have already enjoyed the privileges of study at the city of Marseille, at once so ancient and so very modern. Here will be found a distinguished trio of productive scholars in L. HOULLEVIQUE, C. FABRY, and H. BUISSON. It is doubtful if better opportunities for research in Spectroscopy are to be found in any other place.

At Lyon, a little farther north, yet still in the southern half of France, the student of Physics will find unusual opportunities with the well known investigator, Georges GOUY.

The above mentioned are but a portion of the facilities, intellectual and material, to which France generously opens wide the door.

POLITICAL SCIENCE

**INCLUDING
ECONOMICS AND
INTERNATIONAL LAW**

POLITICAL SCIENCE¹

Creative achievement in the legal and political sciences has long been eminent in France, as is testified by the early commentaries and treatises of CUJAS, DONEAU, BODIN, GODEFROY, DUMOULIN, DOMAT, POTHIER, ROUSSEAU, MONTESQUIEU, and many others. During the early and middle nineteenth century, the literature of political science was enriched by the writings of Benjamin CONSTANT, ROYER-COLLARD, CHATEAUBRIAND, GUIZOT, ROSSI, DE TOCQUEVILLE, DE BROGLIE, PRÉVOST-PARADOL, Jules SIMON, VIVIEN, DUPONT-WHITE, LABOULAYE, and a host of others. As early as 1834 a chair of constitutional law was established at Paris; it was occupied for ten years by the famous ROSSI, who resigned it in 1845 to become ambassador to Rome. In 1871 Émile BOUTMY founded at Paris the "École Libre des Sciences Politiques," a school which has done much to stimulate interest in the study of political science, and which is today attended by a large number of students. Boutmy during his lifetime contributed much to the literature of political science, and his works are well-known and admired in America.

The achievements of recent French scholarship in this field, as in so many others, have not generally been appreciated at their full value in America. In quantity of output the Germans have undoubtedly outstripped the French. But in quality the contributions of French

¹[Drafting Committee: J. W. GARNER, University of Illinois; L. C. MARSHALL, University of Chicago; J. S. REEVES, University of Michigan; A. P. USHER, Cornell University.—ED.]

scholars to scientific literature surpass in lucidity, orderliness of arrangement, and attractiveness of style, those of any other nation. It may be seriously doubted whether any other country at present has a larger group of distinguished authorities or a richer literature in the fields of international law and administrative science.

In more recent years the literature of *Constitutional Law* has been enriched by the scholarly contributions of SALEILLES, ESMEIN, LARNAUDE, JÈZE, DUGUIT, HAURIU, MOREAU, BARTHÉLEMY, BERTHÉLEMY, and others, all of whom (except the first two) are still active. ESMEIN, who died in 1913, was recognized as the highest authority on French constitutional law and legal history. His works are many, the best known being his "Histoire du droit français" and his "Éléments de droit constitutionnel français et comparé." The latter is recognized in France as the standard treatise; it has gone through many editions, and is well known in America. Of the living scholars in this field, DUGUIT, professor in the University of Bordeaux, occupies the first place among the French authorities on political science and constitutional law. His best known works are his "Traité de droit constitutionnel" (2 vols.), "Les transformations du droit public," "Études de droit public" (2 vols.), and "Le droit social"; the first mentioned work is one of the most valuable treatises on comparative constitutional law and government to be found in any language, and for the study of the French constitution it is indispensable.

In the field of *Administrative Science* and *Administrative Law*, French scholars have long excelled those of other countries. The older treatises of CORMENIN ("Questions de droit administratif," 2 vols., 1822), SERRIGNY ("Traité de droit public des Français," 2 vols.,

1845), and VIVIEN ("Études administratives," 2 vols., 1852), laid the foundations of a great branch of jurisprudence such as is not found in America. This literature was later enriched by the more comprehensive treatises of LAFERRIÈRE ("Traité de la juridiction administrative," 2 vols., 1887-1888; the standard work on the subject), of BATBIE ("Traité théorique et pratique du droit public et administratif," 7 vols., 1862), and DUFOUR, ("Traité général de droit administratif," 8 vols., 1867-1870). Of the living authorities in this field, the best known are BERTHÉLEMY of Paris, whose "Traité de droit administratif" is regarded in France as the standard general authority on French administrative law; JÈZE, likewise of Paris, whose recently published work, "Les principes généraux du droit administratif," reflects the highest credit upon French scholarship; HAURIU, of Toulouse, author of many works in this field, the best known of which is his "Précis de droit administratif et de droit public" (8th ed., 1914); MOREAU, of Aix-Marseille, author of a notable study entitled "Le règlement administratif;" BRÉMOND; JACQUELIN; TESSIER; CAHEN; and others, the titles of whose studies it is impossible for lack of space to mention. It may be safely said that no other country has produced so many distinguished writers in this field, or a literature so extensive and valuable.

In the field of *International Law*, both public and private, the French have likewise long held a preëminent place. No other country has produced a larger number of high authorities or a more extensive and scholarly literature. It is impossible here to do more than merely mention the names of the leading authorities. By common consent, RENAULT of Paris is recognized as occupying the first place among the scholars of France, if not

of the world, as an authority on international law. In 1907 he was awarded the Nobel Peace Prize. Associated with him in the University of Paris are PRÉDELIEVRE and PILLET, whose contributions to the literature of the law of war are regarded with high respect, and G. DE LAPRADELLE, whose collection of international arbitrations is well known. BONFILS, of the University of Toulouse, is the author of a treatise entitled "Manuel de droit international public," which is regarded as the standard general authority in French. The ponderous treatise of PRADIER-FODÉRÉ, "Traité de droit international public Européen et Américain," in eight volumes, is the most elaborate work of the kind in any language. MÉRIGNHAC of Toulouse is likewise a well-known authority, and is the author of a number of works, the most notable of which is his "Traité de droit international public" in two volumes. DESPAGNET is another highly respected writer in this field, and the author of many publications, his principal contribution being a work entitled "Cours de droit international public." An important contribution on international law as applied to maritime warfare is DE BOECK'S "De la propriété privée ennemie sous pavillon ennemi"; while LÉMONON and DUPUIS have both made substantial contributions to the literature dealing with the work of the two Hague conferences. Among other important French writers in this field may be mentioned the older authorities, HAUTEFEUILLE, PISTOYE, DU VERDY, ROUARD DE CARD, and the more recent authors, FUNCK-BRENTANO, SOREL, ROLLAND, VALLERY, POLITIS, DESJARDINS, DUPLESSIX, BASDEVANT, IMBART DE LA TOUR, GUELLE, FERAND-GIRAUD, FAUCHILLE (the learned editor of the "Revue Générale de Droit international public"), and WEISS, the author of a monumental work in four volumes entitled "Droit international privé."



CHARLES, BARON DE MONTESQUIEU (1689-1755)

POLITICAL SCIENCE

The large number of distinguished French scholars in this field, the richness of the literature, and the exceptional library facilities, especially in Paris, easily make the University of Paris the most important center of the world for the study of international law.

In the field of *Colonial Administration* and *Legislation*, French interest and scholarship are scarcely less pre-eminent, and the literature is extensive. In this field GIRAULT and LARCHER are the two leading authorities. It may be mentioned in this connection that there is a special school at Paris for the training of young men for careers in the colonial service. At Bordeaux there is a Colonial Institute; at Aix-Marseille, a School of Colonial Medicine and Pharmacy; at Nancy, a Colonial Institute.

In *Legal History*, the researches of the French have been especially noteworthy, and the literature in this field is extensive in quantity and unexcelled in quality. Among the more recent French scholars who have made notable contributions along this line may be mentioned FUSTEL DE COULANGES, LUCHAIRE, GLASSON, DARESTE, PLANIOL, CHÉNON, GARRAUD, and LEFÈVRE. Naturally the French have given much attention to the study of Roman law, as is testified by the treatises of ORTOLAN, GIRARD, GIDE, GÉRARDIN, GIRAUD, CUQ, APPLETON, MAY, AUDIBERT, HUVELIN, and others. On the theory and philosophy of law there are likewise numerous treatises of a scholarly character, among which may be mentioned the writings of LARNAUDE, GÉNY, DUGUIT, LAMBERT, MICHOD, HAURIU, SALEILLES, and DEMOGUE. The most comprehensive treatise on the history of political theory in any language is JANET'S "*Histoire de la science politique dans ses rapports avec la morale*" (2 vols.), a work which not only bears the ear-marks of erudition but is written in a style at once clear and fascinating.

In *Economic Science*, French contributions to economic theory have been numerous, and from the outset have exerted an important influence upon the development of economic thought. The term "political economy" seems to have been first used as a title for a general treatise by Antoine DE MONTCHRÉTIEN in his volume "Traité de l'Économie Politique," published in 1615. His book was a formal exposition of the principles of mercantilism, which probably received a wider acceptance and application as a State policy in France under Colbert than in any other country. On account of the extremes to which mercantilism was carried and the evils that arose therefrom, the first vigorous protest against mercantilism was voiced in France. BOISGUILLEBERT, Marshal VAUBAN, and FÉNELON contributed to that protest. However, it was not until about the middle of the eighteenth century that reaction against mercantilism became an open protest against the economic policies of the State. The leaders in this movement were the founders of the Physiocratic School of economic thought.

From the viewpoint of economic theory, François QUESNAY was the chief figure in this school. His most important writings were an article "Fermiers," one on "Grains," "Tableau économique," "Maximes générales du gouvernement économique d'un royaume agricole," and "Droit Naturel." Among other representatives of this school the names of GOURNAY and TURGOT should be mentioned. Turgot, while keeping himself formally distinct from the physiocrats, was in essential agreement with their main doctrines, and as statesman gave practical application to their theories. In fact, the achievements of the French Revolution were to a large extent the realization of the reforms advocated by the physiocratic school. In addition, their contributions had an immediate and a profound influence on the economic

thinking of the last half of the eighteenth century. Through the writings of Smith and Ricardo, who were both clearly indebted to them, physiocratic influence was carried over into the economic thought of the nineteenth century.

But with the close of the eighteenth century, with the exception of J. B. SAY, France neither produced any important economic works, nor possessed a school of economists, until about 1845, although utopian Socialism flourished in this period.

The rationalism of the eighteenth century led in scientific circles to an unobtrusive but insistent realism, to a distrust of large abstractions, and to a search for objective facts. In the social sciences, this temper resulted in the subordination of the theory of distribution to the concrete problems of State administration and local amelioration. SISMONDI and SAINT-SIMON are more characteristic of the temper of French thought than J. B. SAY and Frédéric BASTIAT, and, as might be supposed, the positive contribution of France in the social sciences is in sociology rather than in economics. Although the liberal views of the eighteenth century have maintained a strong hold on French opinion, there has been a skepticism and a tendency to reaction, which appeared in its extreme forms in the Utopian communism of SAINT-SIMON and FOURIER and in the socialism of Louis BLANC and PROUDHON. This reaction against the mechanistic theories was not without its influence upon John Stuart Mill.

The passion of the realist for facts appears notably in LE PLAY's monographs of families, in the historical work of LEVASSEUR, and in the highly diversified work of P. LEROY-BEAULIEU.

About the middle of the century, there was a revival of "classical" economic thought, which was associated with

the writings of DONOYER and BASTIAT. English influence was clearly uppermost at this time; and after the tariff barriers between England and France had been largely removed in 1860, the influence of the Manchester School became even more pronounced. The commercial agreement just alluded to was largely the work of the eminent French statesman and economist, CHEVALIER, and the English free-trader Cobden.

During the last quarter of the nineteenth century, two factors had an important bearing upon the character of French economic thought. The host of practical questions resulting from the Franco-Prussian War stimulated research in the direction of solutions for these pressing problems. Beginning in 1878, this tendency received additional momentum by the institution of economic courses in the law faculties of various French Universities, in which the instruction was given a more practical turn, greater emphasis being placed upon the legal and administrative phases of these problems.

The teaching of economics is profoundly influenced by this realistic tendency. Economics is studied either as preparation for administrative work or in connection with engineering and business. It is taught in nearly all the technical schools, and some subjects that receive general attention here appear only in the curricula of the technical schools. The economic problems of railroads, for instance, are treated at the *École des Ponts et Chaussées*. Opportunities for advanced study are most considerable at Paris. The larger choice of courses is offered by the Law School and the *École Libre des Sciences Politiques*, the latter a private institution not subject to the authority of the Minister of Public Instruction. Some work in economics is done at the *École Pratique des Hautes Études*, and there are public lectures at the *Collège de France*. At the Law School and at the *École*

Libre, the study of economics is pursued with special reference to meeting the examination requirements for the higher branches of the administration. The École Libre also offers a course for prospective business men. In the domain of industrial legislation, the greatest activity of studies is found, as appears not only from the treatises of PIC, JAY, CAPITANT, CABOUAT, and BELLOUR, but from the numerous courses of instruction offered in nearly every university.

Reference must here be made to the remarkably good work of French writers on cost analysis, in which they are decidedly in advance of the United States, and perhaps of other countries. Much of the good practical work which is being done in the application of statistics to business in America at the present day is a tardy reflection of the method of cost analysis employed in France. This work has been so fruitful that it may be regarded as one of the parts of economics where our students have most to learn from France.

There is much writing on economic theory, as each professor usually publishes his course-lectures. COLSON has published one of the most extensive works, "Cours d'économie politique" (1901-07), and issues an annual supplement. The work of GIDE is well known through the translation so frequently used in our colleges. The most original work on economic theory is that of LANDRY, "L'intérêt du capital" (1904). The most distinguished economists of the generation have been Paul LEROY-BEAULIEU and the late Émile LEVASSEUR. The works of LEROY-BEAULIEU cover a wide range: "L'administration locale en France et en Angleterre" (1872); "L'état moderne et ses fonctions" (1890); "Le collectivisme" (1894, 1909); "De la colonisation chez les peuples modernes" (1874-1908); "Essai sur la répartition des richesses" (1883); "La question ouvrière au

xix^e siècle" (1872); "Traité théorique et pratique d'économie politique" (1896); "La question de la population" (1913); and "Traité de la science des finances" (2 vols., 1879-1912). LEVASSEUR occupies the first place in economic history with scholarly general treatises: "Histoire des classes ouvrières et de l'industrie en France avant 1789" (1859-1901); "Histoire des classes ouvrières . . . de 1789 à 1870" (1867-1904); "La population française" (1889-92); "La France et ses colonies" (1890); "Histoire du commerce de la France" (1911-12); in addition to these general treatises he has also published a number of minor works on economics and geography. GIDE has written upon social problems: "La Coöperation" (1900); "Les sociétés coöperatives de consommation" (1904); "Économie sociale, institutions de progrès social au début du xx^e siècle" (1907-1912).

In *Finance*, there are many notable names. JÈZE has confined himself largely to systematic treatises, "Cours élémentaire de science des finances" (1904-1912); and "Traité de science des finances" (1910). CAILLAUX in the field of taxation has written "L'impôt sur le revenu" (1910); and "Les impôts en France" (1896-1904). René STOURM and Marcel MARION have given special attention to financial history, though both have published in other fields. COLSON is an authority of note upon railroads. His book "Transports et tarifs" (1906) is well known, and his "Abrégé de la législation des chemins de fer et tramways" is of importance. With MARLIO, one of the younger men, Colson presented a notable paper to the International Congress on railroads in 1910. RENAUD has written much on contemporary labor problems, and, in addition, has published a study in Florentine history, ("Histoire du travail à Florence," 1913.) He is also editing the "Histoire universelle du travail," to which

he has contributed. Raphael-Georges LÉVY, of the Institute, is well known in France for his many contributions on economics and financial questions, published mainly in the "Revue des deux Mondes."

Institutions and Societies. The activity of French scholars in the several fields with which this chapter deals has by no means been confined to teaching and writing. Through the agency of learned societies they have also done much to stimulate popular interest in the study of political, legal, economic, and penal science, and to provide a body of scientific literature of great value to students. Thus the Société de Législation Comparée, founded in 1870, collects, annotates, and publishes in an "Annuaire," of which 45 volumes have appeared, the principal laws of different countries. The society holds meetings from time to time at which important legislative reforms and questions of public policy are discussed by experts. The proceedings are published in a monthly bulletin, of which 45 volumes have appeared. At one of the meetings, in 1902, for example, the question of the power of the courts to declare acts of the legislature null and void on the ground of unconstitutionality was discussed by a number of the leading jurists of France, and the published proceedings make one of the most valuable contributions to the literature of the subject to be found in any foreign language. In coöperation with the recently formed Société d'Études Législatives, which likewise publishes a bulletin, it has organized a congress of comparative law, whose purpose is to study the public and private institutions of foreign countries.

A somewhat similar body is the Comité de Législation Étrangère of the Ministry of Justice, which translates and publishes the latest codes of the more important countries.

The Academy of Moral and Political Sciences, one of the five academies of the Institute of France, is a body composed of a small select group of the most distinguished scholars, which devotes itself to the study of questions of legal and political science and which offers prizes for noteworthy productions. The proceedings of the Academy are published, and constitute in the aggregate a valuable body of literature on the subject with which they deal.

Still another learned society which may be mentioned in this connection is the *Société générale des Prisons*. It is composed mainly of professors of criminal law, criminology, and penology, magistrates, lawyers, and administrators of prisons, and is devoted to the study of questions of criminal law, penology, and the administration of penal institutions. The Society publishes a valuable monthly periodical, the "*Revue pénitentiaire et de droit pénal*," of which 40 volumes have appeared.

The *Institut de Droit International*, although its membership is not limited to Frenchmen, was nevertheless founded largely through the initiative of French scholars; they constitute a large and influential part of its membership and its proceedings are published in the French language. The Institute holds annual sessions at different places in Europe and publishes an "*Annuaire*" (26 volumes to date) containing a report of its proceedings, together with the texts, papers, reports, drafts of projects, etc. The Institute has framed proposed codes of international law, dealing with such matters as aerial navigation, maritime war, land warfare, etc.; on account of the distinguished reputations of the members, the views of the Institute have exerted a marked influence on the recent development of international law.

In addition to the publications of learned societies may be mentioned certain publications of the universities.



JEAN-BAPTISTE SAY (1767-1832)

POLITICAL SCIENCE

Notable are the "Annales de l'Université de Lyon," which were started in 1891 and of which 100 volumes have already appeared. The first 40 volumes contain publications dealing with the sciences in general; the others fall into two groups: first, those which deal with the medical sciences; and, second, those which deal with law and letters. This collection is the most extensive and valuable of university publications in France, embracing as it does the results of original work and research. The University of Rennes has published, since 1885, the "Annales de Bretagne," and since 1906 a series entitled "Les travaux juridiques et économiques." Other university publications in France of a serial character are: the "Annales de l'Université de Grenoble," which have appeared regularly since 1890; the "Revue bourguignonne," which has been published by the University of Dijon since 1891; the "Annales des Facultés de droit et des lettres d'Aix" since 1905; and the "Travaux de la conférence de droit pénal" of the Faculty of Law of the University of Paris, since 1910.

Periodicals. The interest and activities of the French in the legal, political, and economic sciences are still further reflected in the numerous reviews and periodicals which they publish. In addition to those already mentioned, and not enumerating those devoted to private law, the best known are: the "Journal de Droit International Privé," which has appeared regularly since 1874, and has since its foundation been edited by the well-known scholar, Edouard CLUNET; the "Revue Générale du Droit International Public," now in its twenty-third year, edited by FAUCHILLE; the "Revue de Droit Public et de la Science Politique," edited by JÈZE, now in its thirty-third volume; the "Revue de Science et de Législation financières," also edited by JÈZE; the "Revue

Générale de Droit, de Législation et de Jurisprudence," founded in 1877; the "Revue des Sciences politiques" (formerly known as the "Annales des sciences politiques"), published by the École des Sciences Politiques (33 vols.); the "Revue Politique et Parlementaire," founded in 1895, and edited by FAURE (87 vols.); the "Revue de Droit Internationale Privé et de Droit Pénal International," founded in 1905; "Questions pratiques de Législation ouvrière et d'Économie sociale"; the "Revue Générale d'Administration" (38 vols.); the "Revue Internationale du Droit Maritime" (29 vols.); the "Revue Communale" (24 vols.); the "Revue d'Histoire Diplomatique" (27 vols.); and the "Archives Diplomatiques" (129 vols.) All of these are scientific publications containing articles by experts, chroniques, book reviews, texts of important documents, and the like.

For the convenience of students, teachers, and others, there is provided a great variety of collections of laws, decisions of judicial and administrative courts, bulletins, "annuaires," "répertoires," "dictionnaires," etc. Among them may be mentioned the great Collection of Duvergier in 115 volumes, containing the texts of all the laws, decrees, ordinances, etc., issued by the French government since 1788; the annals of the Senate and Chamber of Deputies, embracing now more than 450 volumes; the "Annuaire" of French legislation in some 40 volumes; the "Annuaire" of foreign legislation, about 45 volumes; a collection of the principal codes of the world, nearly 30 volumes; Sirey's collection of the laws and "arrêtés," about 115 volumes; Dalloz's "Recueil" of laws and decisions, 70 volumes; the decisions of the Council of State since 1798, over 240 volumes; Dalloz's "Jurisprudence Générale" (1887-1897), 69 volumes, supplement (1887-1897), 19 volumes; Rivière and Weiss's "Pandectes

françaises," 63 volumes; Bequet's "Répertoire de Droit Administratif," over 30 volumes; and various others.

Courses of Instruction. Instruction in political science, public law, international law, and economics in the French universities is invariably given in the Faculty of Law, thus indicating a closer connection between those fields and that of law than generally exists in American universities. Of the sixteen universities, all (except those of Besançon and Clermont-Ferrand) maintain such faculties, and therefore offer instruction in the above mentioned subjects. All of the law faculties grant certificates of capacity and the degree of Licence en Droit, and those of Paris, Dijon, Grenoble, Lille, Lyon, and Nancy are empowered to grant the degree of Doctor of Law. The latter degree is of two kinds, depending on the nature of the course pursued by the candidate: first, the doctorate in the juridical sciences, and, second, the doctorate in the political and economic sciences. Candidates for the doctor's degree must have taken their Licence in law from a French university or have graduated from an acceptable foreign university.

Paris. For the study of the subjects with which this chapter deals, the University of Paris, of course, ranks first. Its Faculty of Law numbers between forty and fifty professors, agrégés, and chargés. It offers a large and varied number of courses, in civil, commercial, and criminal law, Roman law, legal history, constitutional, administrative, and international law (both public and private), political economy, public finance, statistics, industrial and social legislation, comparative legislation and jurisprudence, diplomatic law and history, colonial law and administration, etc. During the year preceding the outbreak of the great war in 1914, more than 8000 students—about one half the total registration of the

university—were enrolled in the Faculty of Law. Viewed, therefore, from the number of students enrolled, the great variety of courses offered, and the number of distinguished professors, the Law Faculty of Paris leads that of all other universities. It may be justly regarded as the most important center of the world for the study of public law, and political science. Among the most distinguished scholars who compose the Faculty of Law may be mentioned BERTHÉLEMY and JACQUELIN in administrative law; BARTHÉLEMY in constitutional and administrative law; JÈZE in administrative law and public finance; LARNAUDE in constitutional law; FLACH in comparative legislation; THALLER and LYON-CAEN in commercial and maritime law; RENAULT, LAPRADELLE, PILLET, and PIÉDELIEVRE in international public law; WEISS in international private law; FOURNIER and LEFÈVRE in legal history; GIDE and FAURE in Economics; not to mention the names of GIRARD, CAPITANT, CUQ, GARÇON, PLANIOL, LEPOITTEVIN, TISSIER, and others, whose subjects fall more distinctly in the field of private law.

Closely connected with the University of Paris is the ancient Collège de France, founded in 1530, which now maintains forty-five chairs, among the occupants of which may be mentioned Paul LEROY-BEAULIEU in economics and FLACH in comparative legal history.

The library facilities for the study of political science, public law, and economics in Paris are unsurpassed. The library of the Faculty of Law contains 80,000 volumes, and 352 seats are provided in the reading room for students. The Collège de France has a library of 10,000 volumes reserved for the use of professors, besides eleven special libraries. There are also many special but extensive collections in the city of Paris which are available to students. Among these may be mentioned the library

of the Court of Cassation, containing 40,000 volumes; of the Court of Appeal, 13,000 volumes; of the Council of State, 36,000 volumes; of the Chamber of Deputies, 250,000 volumes; of the Municipal Council in the Hôtel de Ville, 30,000 volumes; of the Court of Accounts, 25,000 volumes; of the Ministry of Foreign Affairs, 80,000 volumes, besides the libraries of the other ministries; of the Office of Foreign Legislation and International Law, 60,000 volumes; the historical library of the City of Paris, 400,000 volumes; of the office of Legislative and Parliamentary Labor, 400,000 documents and reports; the library of the Bar at the Palais de Justice, 65,000 volumes; the library of the Society of Comparative Legislation, 18,500 volumes, 7,500 brochures, and 2,000 periodicals; of the Colonial School, 15,000 volumes; and various others. Finally there is the National Library containing 3,000,000 volumes and 110,000 manuscripts.

Other Universities. While Paris, by reason of its larger faculties, its greater variety of courses and its more extensive library facilities, is the chief center in France for the study of political science, public law and economics, nevertheless the opportunities and facilities offered by some of the provincial universities are important and valuable.

Among the provincial universities, that of *Lyon* is the largest. The Law Faculty embraces about 20 professors and instructors; among the most distinguished names being those of GARRAUD in criminal law, Paul PIC in international law and industrial legislation, and APPLETON in administrative law. A large number of courses in public law, legal history, political economy, industrial legislation, and public finance are offered, and the enrollment of students exceeds in numbers that of any other French university outside of Paris. The university has

a collection of 300,000 volumes, of which 140,000 are in the law library. It also has 132,000 theses and brochures, and receives 1,300 periodicals.

A smaller French university which enjoys a high reputation as a center for the study of political science is that of *Dijon*. It has a law faculty of about 20 professors and agrégés, among the best known of whom, perhaps, are DESSERTAUX, DELPECH, DESLANDRES, and GAUDEMET. It is one of the favorite universities outside Paris for foreign students, and it maintains a summer school which is attended by many students from abroad.

The University of *Grenoble*, charmingly situated in the Alps region, conducts, like Dijon, a summer school and makes a special appeal to foreign students. During the year 1912-13 over 1,500 students from foreign countries were registered in this university. The Law Faculty, composed of 16 professors and other members, is one of the ablest of the provincial universities, among its most distinguished professors being MICHOUX in administrative law, BEUDANT in constitutional law, CAILLEMER in legal history, and BASDEVANT in international law. All have made notable contributions to the literature of their respective subjects and rank among the leading French scholars in their fields. The Law Faculty offers a great variety of courses, and the University possesses a large and well-equipped library.

The University of *Lille* also has a special strength in political science. The literary activity of its Faculty has been notable; and it numbers such well known scholars as VALLAS, JACQUEY, GUERNIER, LÉVY-ULLMANN, DEMOGUE, SCHATZ, and MOREL.

A smaller and less well-known university, but possessing an able law faculty, is that of *Montpellier* in Southern France. Among its leading scholars are BRÉMOND in administrative law, CHARMONT in philosophy of law,



JEAN LOUIS RENAULT (1843-)

POLITICAL SCIENCE

LABORDE in criminal law, DUBOIS in constitutional law, VALÉRY in international private law, and MOYE in international public law. It offers courses in the usual subjects taught in French law faculties.

The University of *Nancy*, likewise one of the smaller institutions, possesses an able law faculty of 17 professors and agrégés, including such well-known scholars as GÉNY in civil law, MICHON in legal history, ROLLAND in administrative law, GAVET in public law, and SIMONET in constitutional law. The University has a library of nearly 200,000 volumes; and the city library contains about 145,000 volumes, including the publications of over 400 learned societies and 263 reviews and periodicals.

One of the oldest and best known provincial universities is that of *Poitiers*, which has an able law faculty and a library of 100,000 volumes and 180,000 theses and brochures. The University of *Rennes*, situated in the picturesque country of Brittany, maintains a summer school and, like Dijon and Grenoble, makes a special appeal to foreign students. It has a law faculty of about 20 members, several of whom enjoy distinguished reputations. The university library contains 150,000 volumes and over 67,000 brochures. It is unique in possessing a collection of the British and Foreign state papers of 560 volumes.

The Universities of *Bordeaux* and of *Toulouse*, to mention only two others, have strong law faculties, and offer excellent facilities for the study of political science and public law. Among the professors of Bordeaux, the best known to American scholars is LÉON DUGUIT, the most eminent of the living French authorities in the fields of constitutional law and political science. At Toulouse, perhaps the best known to us are ROUARD DE CARD, in international private law, MÉRIGNHAC, in

international public law, HAURIU, in administrative law, THOMAS and DECLAREUIL, in legal history, and CÉZAR-BRU, in economic legislation.

Non-university Instruction. Aside from the Universities, there are in France a number of private institutions which make a specialty of instruction in the political and economic sciences. The more important of these are of course in Paris, and include the École Libre des Sciences Politiques; the École des Hautes Études Sociales; the Collège Libre des Sciences Politiques; and the École de Législation professionnelle. The University of Lyon also maintains an Institut des Sciences Économiques et Politiques; there are also Instituts Coloniaux at Bordeaux and Nancy for training young men for the colonial service. Finally, there is an École des Hautes Études Commerciales at Paris and Institutes for the study of commerce at Paris, Grenoble, and Nancy.

Of the above mentioned schools the best known is the École Libre des Sciences Politiques at Paris. It was founded by the late Émile BOUTMY, who was its first Director. It is now in its forty-fifth year, and is under the direction of M. EICHTHAL of the Institute. It offers a great variety of courses in the administrative sciences, public finance, political and social economy, international, public and private law and diplomacy, and diplomatic history. Students and auditors are admitted to the lectures without examination, and there is no age requirement for attendance. The course normally runs through three years, and a diploma is granted upon the completion of the course. The corps of instruction is composed of a large number of distinguished scholars of Paris, including many of the professors of the University of Paris, members of the Council of State, members of Parliament, government officials, etc. The school issues

a valuable bi-monthly publication, the "Revue des Sciences Politiques," which contains articles mainly by members of the faculty. It possesses a library of about 25,000 volumes and receives some 160 French and foreign reviews and periodicals. The school is very popular and is attended by a large number of students, including Americans and other foreigners preparing for the diplomatic service.

PSYCHOLOGY

PSYCHOLOGY¹

There is a French Psychology as there is an English and a German Psychology. It does not have the distinctly introspective nor the experimental-psycho-physical character that are predominant features of the English and the German psychology. Positivism gave rise to TAINE (1828-1893), whose struggle against the spiritualistic interpretation of psychologic phenomena prepared the way in France for our present-day ideas regarding the relation of genius to insanity and of double personality and allied phenomena to the hysterical constitution. Investigation of these relations was greatly advanced by the work of CHARCOT (1825-1895), in his clinic for nervous and mental diseases at the Salpêtrière (1880), which stimulated the scientific imagination of French students of psychology, and so opened the way for a series of brilliant researches, within recent years, into the nature of certain abnormal mental phenomena. These studies appear to be of fundamental importance. Under controlled conditions they penetrate beyond the data of introspection, and they have already developed our concept of the Unconscious as a residuum of experiences, intelligent in the sense of being adaptable, and hence as supplying the motives of behavior, whether normal or abnormal.

The French psychologists, too, have developed the social aspects of their science. The disciples of Comte had been busy at finding the place of social science in a

¹[Drafting Committee: J. R. ANGELL, University of Chicago; R. H. GAULT, Northwestern University.—ED.]

hierarchy of sciences. Those of spencer had been occupied with tracing supposed analogies between biological organisms and society, which was assumed to be an organism also. Gabriel TARDE (1843-1904), however, who was professor of Modern Philosophy at the Collège de France from 1900 until his death, was the genius who directed the current of thought away from these purely academic ways, and drew attention to the analysis and description of the nature and combinations of certain distinct social phenomena. First were his studies of imitation as a social fact, which appeared in the "Revue philosophique" between 1882 and 1884, and eventually were brought together in a volume, "Les Lois de l'imitation," in 1890; this work went into its second edition in 1895. It marks an epoch in the history of psychology, for it opened the eyes of students to the possibility of successful application of psychological method to the study of the behavior of groups. "La Philosophie pénale" appeared in 1891; and later, among the products of Tarde's work in the Collège de France, came his "Études pénales et sociales" and "Psychologie économique."

In the field of general psychology, French investigators stand out less prominently, but here also progress has been made, and the work of Th. RIBOT (1839-1903) is a distinguished record. He became professor of Experimental Psychology in the Collège de France in 1885. In 1888 he set forth a "motor theory" of attention, which was later more fully developed by the American James Mark BALDWIN in "Mental Development in the Child and the Race: Methods and Processes," (1906), and by Ribot himself in "La Psychologie des Sentiments," (1897), in which the author transformed the feelings into phenomena of the central nervous system accompanying bodily processes. Among other works by



ALFRED BINET (1857-1911)

PSYCHOLOGY

Ribot which have set the course for present day investigations in France are the following: "L'Hérédité psychologique" (1882); "Les Maladies de la volonté" (1883; 14th ed., 1899); "Les Maladies de la personnalité" (1885; 8th ed., 1899); "La Psychologie de l'attention" (1889).

France is the source of a movement which, in American departments of Psychology, is occupying more attention than any other single object: the invention and application of psychological tests. Alfred BINET (1857-1911), in collaboration with Thomas SIMON (1873-), originated the Binet Tests. Binet established the first psychological laboratory in France at the Sorbonne in 1889, and in 1895 he began the publication of "L'Année psychologique," in which his most important works appear.

Taking the Psychological Review Indices for 1913 and 1914, about one-sixth of all the world's titles on Abnormal Psychology are in the French language by French authors. This will suggest the activity of contemporary work in psychology in France.

Instruction. *Paris.* All of the sixteen universities in France offer inducements to graduate students in psychology.

Naturally the University of Paris presents the widest range of opportunities, both directly through the university itself and indirectly through numerous auxiliary institutions in the neighborhood. Among these, one must mention first of all, from the point of view of the student of psychology, the Collège de France. Indeed one would hardly go to Paris for research in psychology without taking advantage of this institution of learning.

At the University of Paris are DELBOS (Philosophy and Psychology), Georges DUMAS (Experimental Psychology), LAIGNEL-LAVASTINE (whose studies of Aphasia and of Dementia in syphilitic cases are well known), and

Revault d'ALLONES (whose name is known to students of general Psychology for his work on "Attention" and "Les troubles de l'intelligence"). At the clinic for mental diseases at the Salpêtrière are J. VOISIN, J. SEGLAS, whose investigations relate chiefly to Hallucinations, and P. CHASLIN.

At the Collège de France is Pierre JANET (Experimental Psychology), a giant among scientists, who of contemporary French psychologists is by far the best known to American students. He first demonstrated subconscious perception of sensory stimulations applied to anæsthetic tactile and visual areas; and, more fully than any other investigator, he has analyzed the various forms of amnesia. In his "*L'Automatisme psychologique*" (1889) and various recent publications in the "*Journal de Psychologie normale et pathologique*" and other periodicals, he has, on experimental grounds, developed the theory of hysteria in its numerous manifestations, such as double personality, automatic writing, phobias, etc., as phenomena of dissociated processes independent of personal consciousness. These processes he conceives as expressions of residua of early experiences; systematized or organized residua which do not directly affect consciousness, but which are, nevertheless, intelligent, in the sense that, in the conditions of experiment, they lead to suitable adaptations of behavior. It is thus that the scientific imagination of Janet and his collaborators carries us into an experimental psychology that reaches back of the data of the introspection of normal consciousness.

At the Sorbonne, also, are laboratories of Physiological Psychology, PHILIPPE, Director; of Physiology of Sensation, Ch. HENRY, Director; Experimental Psychology, at the Asylum of Villejuif, Edouard TOULOUSE, Director; of Pathological Psychology, MARIE, Director. There is



PIERRE JANET (1859-)

PSYCHOLOGY

also the Laboratory of Anthropology under the direction of MANOUVRIER and PAPILLAUT.

The institutions for research in the city of Paris offer almost unlimited opportunity to the student who is interested in physiological psychology and mental pathology. Moreover, the French universities, almost without exception, and especially the University of Paris and the Collège de France, are rich in opportunities for the student whose interest is in the social aspects of Psychology, particularly in as far as this subject leads into the study of Ethnography, Anthropology, and Antiquities. Almost every university has its museum or society devoted to one or all of these subjects.

Other Universities. While the great contributions to Psychology by French scholars have been made in the fields mentioned above, it is not to be inferred that in other regions they are inactive. Noteworthy work has recently been done by R. BOURDON at Rennes, for example, in the perception of movements. Studies of attention have been made in the laboratory at Montpellier in which the subjects were young children, and in the same university FOUCAULT has lately contributed to certain aspects of the psychology of learning.

On the whole it can be said that, in the provincial universities outside of Paris, where the great hospitals are lacking, the problems recently under investigation are those of the older laboratory type which, to distinguish them from questions of abnormal and social psychology, may be termed psycho-physical.

RELIGION

RELIGION¹

The chief contribution of France to the modern study of religion is in the field of the history of religions, where Paris alone now offers an organized body of instruction and where the work of French scholars has always been preëminent. For example, the scientific study of the Avesta was first seriously attempted by Eugène BURNOUF (1801-1852), who laid the foundations of our present knowledge of Zoroastrianism ("Zendavesta," Paris, 1829-1843; "Commentaire sur le Yaçna," Paris, 1833), following up the explorations of that forerunner of modern scholarship, ANQUETIL DUPERRON. BURNOUF also did pioneering work of the first importance in the study of Indian Buddhism ("Introduction à l'histoire du Bouddhisme Indien," Paris, 1844; "Lotus de la bonne loi," Paris, 1852), and developed the study of Hinduism ("Bhâgavata Purâna," vols. 1-3, Paris, 1840-1849).

The succession has been notably carried on by Abel BERGAIGNE, (1838-1888), whose revolutionary study of the Veda destroyed completely the earlier view of the extreme simplicity and antiquity of both literature and religion ("La religion védique d'après les hymnes du Rig-Veda," 3 vols., Paris, 1878-1883); and by James DARMESTETER, with his studies and translation of the Avesta. The entire field of Indian religion has been covered by the erudition of Auguste BARTH ("Quarante ans d'Indianisme," 4 vols., Paris, 1914).

¹[Drafting Committee: G. B. FOSTER, University of Chicago; N. B. NASH, Episcopal Theological School, Cambridge.—ED.]

As with all other branches of Egyptology, the study of Egyptian religion owes much to the great name of Gaston MASPERO (1846-1916), whose scattered essays have been collected under the title: "*Études de mythologie et d'archéologie égyptiennes*" (6 vols., Paris, 1893-), and constitute the most important single contribution to the subject.

Of far different character from all these scholars, but of very great significance for the study of religion, is the genius of Ernest RENAN (1823-1892). His "*Histoire du peuple d'Israël*" (5 vols., Paris, 1887-1894), and his far more important "*Histoire des origines du Christianisme*" (7 vols., Paris, 1863-1882), represent, as does the work of no other man, the reaction of the modern Occidental mind upon its inherited religion, and their contemporary significance may have somewhat overshadowed their undeniably great historical value. The "*Vie de Jésus*" (1863; subsequently printed as vol. 1 of the "*Histoire des origines*"), though marred, from the standpoint of present-day taste, by excessive sentimentality, and from that of contemporary scholarship by excessive reliance on the Fourth Gospel, remains a classic.

The study of religion acquired academic standing in France in 1880, when Albert RÉVILLE (1826-1906) was appointed to the new chair of the history of religions at the Collège de France. This recognition, together with the foundation in the same year of the "*Revue de l'histoire des religions*," still the chief periodical in its field and one of the very best in any field, gave great stimulus to the historical study of religion. Réville himself contributed much to this study ("*Histoire des religions*," 3 vols., Paris, 1883-1886; Hibbert Lectures, 1884; "*Prolégomènes de l'histoire des religions*," Paris, 1880, 4th ed., 1886; tr. London, 1884; "*Jésus de Nazareth*," 2 vols., Paris, 1897).

The instruction offered by a single chair at the Collège de France was amplified in 1886 by the foundation of the Section des Sciences Religieuses at the École Pratique des Hautes Études. Here has been built up undeniably the leading school in the world for the historical study of religion.

But before recounting the opportunity for study there, mention must be made of the work of Émile DURKHEIM, professor of the science of education and sociology, Faculty of Letters, University of Paris. He is the leader of the so-called "sociological school," the most notable recent development in the study of primitive religions. In reaction from the excessive reliance upon the more or less hypothetical psychology of primitive man which marked previous study, Durkheim and his followers emphasize the influence of social environment, and find in totemism the primitive form of religion (*Durkheim*, "Les formes élémentaires de la vie religieuse," Paris, 1912, tr. New York, 1915). *Hubert* and *Mauss*, "Mélanges d'histoire des religions," Paris, 1909, is a collection of studies reprinted from "L'Année sociologique" (Paris, 1896-), which represents this school both through its exhaustive review of current literature and through important articles by Durkheim and others. Outside the "sociological school," excellent work has also been done by French scholars in the field of "primitive" religions.

Instruction at Paris. (I) *École Pratique des Hautes Études: Section des Sciences Religieuses*. The work done here is admirably illustrated by the seventeen essays published under the title of "Études de critique et d'histoire" by the Section des Sciences Religieuses in 1896. The subjects of these essays range from Melanesian taboo to the Christology of Paul of Samosata.

At the present time twenty directors of studies give instruction in sixteen departments, of each of which but brief mention can be made. The department, director or directors, courses in 1914-1915, and important publications are given in order.

Religions of uncivilized peoples, Marcel MAUSS.

Primitive religions of Europe, Henri HUBERT: Irish mythology; The sculptured monuments of the religion of the Gauls. (Mauss and Hubert, both vigorous adherents of the sociological school, have collaborated in other publications beside the one already mentioned; see "Essai sur la nature et la fonction du sacrifice," "L'Année sociologique," vol. II, 1899, pp. 29-138).

Religions of pre-Columbian America, Georges RAYNAUD: Civil and religious history of pre-Columbian Central America, Hieratic writings and hieroglyphics of the same.

Religions of the Far East, Marcel GRANET: Feasts of ancient China ("Revue de l'histoire des religions," LXIX, 1914, No. 2, "Programme d'études sur l'ancienne religion chinoise.")

Religions of India,—(1) Sylvain LÉVI ("La science des religions et les religions d'Inde," Paris, 1892; Asanga: Māhāyāna-sūtralamkāra, "Exposé de la doctrine du grand véhicule selon le système Yogācāra," 2 vols., Paris, 1907-1911). (2) Alfred FOUCHER: The Chandogya-Upanishad, Buddhist texts.

Assyro-Babylonian religion, Charles FOSSEY: Some Babylonian and Biblical myths ("La magie assyrienne," Paris, 1902; "Manuel d'assyriologie," vol. I, Paris, 1904).

Religions of Egypt, Émile AMÉLINEAU: Ancient texts relative to the religion and morals of Egypt, Book of the Dead, ch. CXLVI ("Essai sur l'évolution historique et philosophique des idées morales dans l'Égypte ancienne," Paris, 1895; "Prolégomènes à l'étude de la religion



ERNEST RENAN (1823-1892)

RELIGION

égyptienne," vol. I, Paris, 1908, vol. II in press; Amélineau has also made notable contributions to the study of Christianity in Egypt: see "Essai sur le gnosticisme égyptien," Paris, 1887; "Littérature chrétienne de l'Égypte grecque et copte.")

Religions of Greece and Rome,—(1) Jules TOUTAIN, secretary of the Section: Cults of the mountains and high places in Greece; Religion and cults in the province of Egypt during the Roman period ("Les cultes païens dans l'empire romain," vols. I-II, Paris, 1907-1911; in "Études de mythologie et d'histoire des religions antiques," Paris, 1909, Toutain appears as a lively critic of the sociological school in their devotion to totemism). (2) A. BERTHELOT.

Religions of Israel and the western Semites, Maurice VERNES, president of the section, and professor in the Collège Libre des sciences sociales: Ancient organization of the clergy and cultus in Israel; Ecclesiastes ("L'histoire des religions, son esprit, sa méthode . . ." Paris, 1887; "Histoire sociale des religions," vol. I, Paris, 1911).

Talmudic and Rabbinic Judaism, Israel LÉVI: Rabbinic commentaries on the Psalms; The religious poems of Juda Halévi (See "Revue des études juives," Paris, 1880-, passim; LÉVI has been its editor since its beginning).

Islam and religions of Arabia, Clément HUART: The commentary of Tabari on ch. IV of the Koran; Persian mysticism according to the Mesnevi of Jelâl-ed-Din Rûmî ("Le livre de la création et de l'histoire," text and translation, 5 vols., Paris, 1899-1916; "Histoire des Arabes," 2 vols., Paris, 1912-1913).

Byzantine Christianity, Gabriel MILLET: Byzantine archaeology and religious history (Millet has edited a description of "La collection chrétienne et byzantine des Hautes Études," Paris, 1903).

Christian literature and church history,—(1) Eugène de FAYE: Moral and religious ideas and doctrines in the 3rd century A.D.; Apocryphal acts of Thomas and others ("Clément d'Alexandrie," 2d ed., Paris, 1906; "Études sur les origines des églises de l'âge apostolique," Paris, 1909). (2) Paul MONCEAUX: Documents concerning the soldier-martyrs of the end of the 3rd century; Christian epigraphy of southern Gaul ("Histoire littéraire de l'Afrique chrétienne," 4 vols., Paris, 1901-1912).

History of doctrines and dogmas,—(1) François PICAUVET: The persistence of mediaeval philosophic and theological doctrines in the philosophers and theologians of the 17th and 18th centuries; The doctrines and dogmas of Christianity in the councils of the first six centuries ("Esquisse d'une histoire générale et comparée des philosophes médiévales," 2d ed., Paris, 1907; "Essais sur l'histoire générale et comparée des théologies et philosophies médiévales," Paris, 1913). (2) ALPHANDÉRY.

History of Canon Law, R. GÉNESTAL: Letters of Ivo of Chartres; Relations and conflicts between the ecclesiastical and the secular jurisdiction ("Revue de l'histoire des religions," LXIX, 1914, No. 1, "L'enseignement du droit canonique").

History of the Catholic Church since the council of Trent, L. LACROIX: History of the Civil Constitution of the Clergy.

Thus, in the Section Religieuse of the École des Hautes Etudes alone there is such an opportunity for the study of religions as can be found in no other city. But this splendid faculty is supplemented by several other institutions in Paris.

(II) *École Pratique des Hautes Études: Section des Sciences Historiques et Philologiques.* Egyptian antiquities and philology, Alexandre MORET ("Du caractère

religieux de la royauté pharaonique," Paris, 1902; "Le rituel du culte divin journalier en Egypte," Paris, 1902). Ancient history of the Orient, Isidore LÉVY, History of Israel. Semitic languages, Mayer LAMBERT, the Book of Isaiah ("Commentaire sur le Séfer yesira ou livre de la création," Paris, 1891). Byzantine and modern Greek, Jean PSICHARI: St. Mark's gospel.

(III). *University of Paris, Faculty of Letters*. Antonin DEBIDOUR, professor of Christianity in Modern Times: Religious history of Europe since 1878 ("Histoire des rapports de l'église et de l'état en France de 1789 à 1870," Paris, 1898; "L'église catholique et l'état sous la troisième république," 2 vols., Paris, 1906-1909). History of Christianity in Antiquity and the Middle Ages, Charles GUIGNEBERT, chargé de cours: Christian life in the 4th century; Problems in the Apostolic Age ("Tertullien," Paris, 1902; "Manuel d'histoire ancienne du Christianisme: les origines," Paris, 1906; "Le problème de Jésus," Paris, 1914). History of the religion of the Hebrews, Adolphe LODS, chargé de cours: The beginnings of Hebrew literature; The prophets of Israel and their times ("Le livre d'Hénoch, fragments grecs . . .," Paris, 1892; "La croyance à la vie future et le culte des morts dans l'antiquité israélite," Paris, 1906). History of Christian ideas and Literature of the 16th-19th Centuries, Louis RÉBELLIAU, chargé de cours: Jansenism in France ("Bossuet, historien du protestantisme," Paris, 1892; "Bossuet," in "Les grands écrivains français," Paris, 1900).

(IV). *Collège de France*. Paul FOUCART, professor of Greek epigraphy and antiquities, ("Des associations religieuses chez les grecs," Paris, 1873; three books on the Eleusinian mysteries, Paris, 1895, 1900, 1914). Alfred LOISY, professor of the history of religions: The epistle to the Galatians, The history of sacrifice; the Abbé LOISY

won fame by his reply to Harnack's "Das Wesen des Christentums" ("L'évangile et l'église," 3d ed., Paris, 1904); equally important are his study of the Fourth Gospel ("Le quatrième évangile," Paris, 1903) and his two volumes on the Synoptic gospels ("Les évangiles synoptiques," Paris, 1907-1908); his five essays published under the title, "À propos d'histoire des religions" (Paris, 1911), represent his complete acceptance of the comparative method in the study of religion.

Libraries. Beside the many general libraries in Paris, a few special collections should be mentioned: (1) Library of the Société de l'histoire du Protestantisme français, about 60,000 vols. and mss.; (2) Library of the Faculté Libre de Théologie Protestante, about 36,000 vols. on all branches of the study of Christianity; (3) Library of the Alliance Israélite, about 25,000 vols. on Judaism; (4) Library of the École normale Israélite, about 30,000 vols. on Jewish history and literature; (5) Library of the École Rabbinique Centrale, about 15,000 vols.

Unique and extremely useful to the student is the Musée Guimet, with its 32,000 vols. and its large collection of religious objects of all kinds, photographs, etc., dealing principally with the religions of the Far East, but including collections for many other religions.

SOCIOLOGY



AUGUSTE COMTE (1798-1857)

SOCIOLOGY

SOCIOLOGY¹

The French have made many important contributions to the development of sociology as a science. The term itself was invented by Auguste COMTE, who may be regarded as the founder of systematic sociology. While a young man of about twenty, Comte became associated with SAINT-SIMON, who exercised a decisive influence on the direction which his speculation in the field of social philosophy took. He was in no sense a follower of Saint-Simon; but (to use his own word) Saint-Simon "launched" him by suggesting the two starting-points of what was later developed into the Comtist system — first, that political phenomena are as capable of being grouped under laws as other phenomena; and second, that the true destination of philosophy must be social, and the true object of the thinker must be the reorganization of the moral, religious, and political systems. Although he later broke with Saint-Simon on account of the latter's sentimental schemes of social reconstruction, Comte was nevertheless indebted to him for these ideas, and others of less importance, which he developed into a philosophical structure, that has had a profound influence on all subsequent sociological thinking.

Prior to Comte, sociological studies everywhere had been largely fragmentary and polemical. He undertook to discover a principle of unity in society that would mean for sociology what the law of gravitation meant for

¹[Drafting Committee: T. N. CARVER, Harvard University; F. S. DEIBLER, Northwestern University; F. H. GIDDINGS, Columbia University; E. A. ROSS, University of Wisconsin.— Ed.]

physics. He was obliged, however, to abandon his quest for such a principle, and was led to emphasize in the development of his social philosophy three stages,—the theological, the metaphysical, and the positive, or scientific. These three stages had been suggested both by Turgot and Saint-Simon, but with Comte they became fundamental. In reality Comte was a system-builder, and it has been said of him that “so well did he do his task that social philosophy since his day has done little more than to fill in his outline and correct and supplement his methods.”

Following Comte, the contributions of French writers to the development of sociological thought were meager until after the war of 1870. However, in this interval, CURNOT, in his “*Essai sur le fondement de nos connaissances*” and in his second volume, “*Enchaînement des idées fondamentales*,” did undertake to build on the physical and biological sciences a new positive science that should treat of social questions. By 1870, Herbert SPENCER had shown the application of the principle of evolution to the development of social institutions, and had particularly emphasized the resemblances between social and biological organisms. Starting with this concept, ESPINAS, in his work, “*Les Sociétés animales*” (Paris, 1877), endeavored to illustrate and prove this thesis. During the next thirty years, the French scientists originated and developed some of the most widely accepted sociological concepts and principles. The result has been that French scholarship has exercised a dominating influence in stimulating sociological investigation the world over. Some American scholars have expressed their gratitude by saying that they have profited more from the French sociologists than from all others combined.

Without attempting to make an inclusive list, the following may be cited as persons who have made distinct



ÉMILE DURKHEIM (1858-)

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contributions to the development of the subject. Among those who look upon classification as the principal means of understanding social structure and social processes, appear the names of LITTRÉ, DE ROBERTY, and LA COMBE. FOUILLÉE is representative of those who hold to the analogy between social and biological organisms. Closely akin to this group is LE BON, who has interpreted society in terms of a quasi-psychological organism. Gabriel TARDE, in his "Laws of Imitation," represents those who have endeavored to explain social progress in terms of a single principle. The name of Vacher DE LA POUGE would appear among those who endeavor to explain social progress through struggle and survival. Finally, the name of LE PLAY, who founded the "Société internationale des études pratiques d'économie sociale," stands high among those who follow the inductive method in studying social facts and forces.

In addition to the above list, there are those who have made distinct contributions to some specific field of sociological research, or to the method of studying the subject. QUÉTELET should be mentioned in this connection for his efforts to adapt statistical methods to the analysis and evaluation of social forces. Notable also has been the work of LETOURNEAU on the evolution of the family, of laws, of property, etc.; of DUMONT on the effect of depopulation and caste on the objective of sociology; of DURKHEIM, on primitive forms of religious life, on suicide, prohibition of incest, etc.; of HUBERT and MAUSS, on sacrifice and magic; of BOUGLÉ, on the régime of castes; of SIMIAND on the wages of mine workers; and of many others.

Periodicals and Societies. Besides direct contributions to the subject, as indicated above, the French have taken an active part in founding journals and societies

devoted to the advancement of sociological study and research.

The most important of the journals are: "La Réforme Sociale," founded by LE PLAY in 1881; "La Science Sociale, suivant la méthode de LE PLAY," edited since 1886 by Ed. DEMOULINS; "Annales de l'Institut International de Sociologie," edited since 1894 under the direction of René WORMS; "Revue internationale de Sociologie," published since 1896; "L'Année Sociologique," edited since 1899 by E. DURKHEIM.

Among the learned societies in this field, there should be mentioned the "Société d'Économie Sociale," "the Société de Statistique de Paris," and the "Société d'Économie Politique" located at Paris. Anthropological societies are located at Paris, Grenoble, Lyon, and Montpellier.

Instruction in the Universities. The chief center in France for the study of sociology is at Paris. In the Law School of the University of Paris, courses are offered by GIDE, on comparative social economy; by GARÇON, on criminal law and comparative penal legislation; by BEAUREGARD, RIST, PERREAU, and TRAUCHY, on political economy. Under the Faculty of Letters, courses are offered by BOUGLÉ on socialism and social and political economy, by DURKHEIM on education and sociology. In the College of France, courses are offered by FUSTER, on the struggle against tuberculosis and housing reforms, and on social insurance; by IZOULET, on social philosophy; by LE CHATELIER, on sociology of the Mussulmans; and by RENARD, on the history of labor.

Outside of Paris, to mention some of those who appear in the faculty lists of the various Colleges and Universities as devoting their entire time to the subject of sociology: at the University of Bordeaux, Gaston

RICHARD offers courses in the field of social science, as does also Gabriel MELIN at the University of Nancy. Courses in the kindred subjects of political economy, history of economic thought, criminal law, and industrial legislation are given at the Universities of Aix-Marseille, Bordeaux, Caen, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Poitiers, Rennes, and Toulouse.

ZOÖLOGY

ZOÖLOGY¹

It is universally recognized that the French have taken a prominent part in the development of biological science. In the nineteenth century, CUVIER laid the foundations of comparative anatomy and Claude BERNARD gave an immense impetus to experimental physiology, while LAMARCK, DUJARDIN, and PASTEUR were pioneers and innovators in three of the greatest biological achievements of the century. These three outstanding events that so profoundly influenced the course of biological thought are: the announcement of the theory of organic evolution, the discovery of protoplasm, and the establishment of the germ-theory of disease in connection with the science of bacteriology. We may first briefly consider the part played by Frenchmen in launching these three great movements, and then take up matters that are more strictly zoölogical. Inasmuch as Botany receives consideration in a separate chapter, that which follows in this chapter will apply to Zoölogy and its various subdivisions, and, also, to some of those movements which in their broad applications affect the entire field of biological science.

(1) *Organic Evolution.* The doctrine of organic evolution has produced the greatest intellectual ferment of the past century. It has entered into the framework of all scientific thinking, and has been characterized as "one of the

¹[Drafting Committee: G. N. CALKINS, Columbia University; F. R. LILLIE, University of Chicago; W. A. LOCY, Northwestern University.—ED.]

greatest acquisitions of human knowledge." In the establishment of this generalization a French zoölogist, LAMARCK, was the leader. Although the evolutionary point of view had been vaguely suggested at different times, Lamarck (1744-1829) was the first to announce a comprehensive theory of organic evolution that has maintained to the present time a creditable standing in the intellectual world. His immediate predecessors, BUFFON, GOETHE, and ERASMUS DARWIN, dealt with the same great theme, but much less rigorously than Lamarck, whose theory was so much more thoroughly thought out that it completely superseded all earlier attempts and marks the beginning of evolutionary thought in its modern sense. It was first announced by Lamarck in 1800 and was somewhat elaborated in 1802, 1803, and 1806. Finally, it was fully expounded in his "Philosophie Zoologique," in 1809, and that year marks the first distinct epoch in the rise of evolutionary thought.

This is not the place to enter into consideration of the principles laid down by Lamarck; but it is a significant circumstance that, a century after being promulgated, his principle of use-inheritance should have been revived, and, under the title of "Neo-Lamarckism," should occupy such a prominent place in the discussions regarding the factors of organic evolution that are being carried on at the present time. This shows better than anything else the position commanded by this French zoölogist in the natural science of the nineteenth century.

After a long lapse of time the field of organic evolution is now represented in Paris by a professorship of organic evolution under the charge of Maurice CAULLERY.

(2) *Protoplasm*. The consequences that followed from the discovery of protoplasm, and the recognition of its true nature, form another notable scientific advance of



JEAN-BAPTISTE LAMARCK (1744–1829)

zoölogy

the century. Although this substance had been casually observed at intervals from 1755 onwards, its true nature was entirely unrecognized. The turning point came when Félix DUJARDIN (1801-1860) experimented with it and distinguished between it and other forms of matter, such as mucus, gum, gelatine, albumen, etc., with which it had superficial resemblance. He designated it "sarcode," recognized it as the physical substratum of life, and in 1835 announced it as a living jelly endowed with all the properties of life. This idea received elaboration from various sources, and, finally, culminated in the demonstration by Max SCHULTZE (1861) of the essential identity of all living substance in plants and animals and now designated protoplasm. This, in combination with the cell theory of SCHWANN, led to the foundation of biology in its modern sense, and Dujardin ranks as the scientific discoverer of protoplasm.

(3) *Germ Theory of Disease.* The brilliant work of PASTEUR (1822-1895) belongs to all biology. Starting his scientific career as a chemist, he branched into biological fields, and through his later work came to be recognized as one of the foremost men of biological history. His supreme service was in applying the result of biological investigation to the benefit of mankind. In laying the foundation of micro-parasitology (about 1875), he opened a subject that overlaps the different conventional divisions of biology, and his foundations have been built upon by botanists, zoölogists, and physicians. His investigation gave an immense impulse to the study of pathogenic organisms; and while his researches supplied the foundations of scientific medicine, at the same time they opened investigations in the life-history of micro-organisms that have been so extensively developed by zoölogists.

His studies on the spontaneous generation of life, his observations on the nature of fermentation, on the micro-organisms causing silkworm diseases, and on the floating matter of the air, found applications in physiology and surgery as well as in other departments of biological investigation. These studies also formed the basis from which, by a series of ascending steps, he rose to the study of toxins and antitoxins and to the formation of various serums and vaccines. The establishment of the first Pasteur Institute in Paris, in 1888, served to unify his work and to house the different kinds of biological investigation he had set under way.

The temper of the French people is shown in the popular vote taken in 1907, that placed Pasteur at the head of all their notable men. This is significant of the cordiality extended by the French mind to scientific investigation and to intellectual achievements.

The three scientific achievements spoken of above were of general application to all biological science. We may now turn attention more specifically to the zoölogical side; and, in doing so, it tends to clearness to recognize that some of the subjects of the medical curriculum are zoölogical in nature. Such subjects as anatomy, histology, embryology, and physiology, while they have their practical utility for medical men, are divisions of the zoölogical territory. Likewise, palaeontology, which has been so cultivated by French investigators, belongs to the morphological side of zoölogy.

(4) *Comparative Anatomy.* The morphological and physiological aspects of animals constitute the foundation of the zoölogist's training. In the early years of the nineteenth century, the influence of CUVIER (1769-1832) was dominant in zoölogy. This French zoölogist and legislator showed great zeal for the study of animal

structure; he founded comparative anatomy and vertebrate palaeontology. The influence of LINNÆUS had been to arouse an interest in natural history and in the systematic arrangement of animals; but CUVIER directed attention to more essential features, such as the structure, or organization, of animals, and he turned the current of zoölogical progress into better and more promising channels. In his investigations, he covered the whole field of animal organization, from the lowest to the highest; and, combining his results with what had been accomplished by earlier workers, he established comparative anatomy on broad lines ("Leçons d'anatomie comparée," 1801-05) as an independent branch of natural science. In the meantime he had also engaged in the study of fossil vertebrates, and the publication of his "Recherches sur les ossements fossiles" (1812) founded the science of vertebrate palaeontology.

LAMARCK, his distinguished contemporary, observed the fossil remains of invertebrate animals and, in the early years of the nineteenth century, founded invertebrate palaeontology. It thus appears that the beginnings of comparative anatomy of living animals and the comparative study of fossil remains rest on French foundations.

Simultaneously with the earlier work of Cuvier, the talented BICHAT (1771-1801) essayed a deeper analysis of animal structure. He directed attention especially to the tissues of animals, and thereby prepared the ground for the rise of histology.

In the domain of comparative anatomy, the work of CUVIER was developed in France by Henri MILNE-EDWARDS (1800-1885) and by LACAZE-DUTHIERS (1821-1901). Milne-Edwards' "Leçons sur la physiologie et l'anatomie comparée," in fourteen volumes, 1857-1881, is a mine of information for the comparative anatomist

and the physiologist. Lacaze-Duthiers, by numerous researches, by his stimulating influence on students, and by his editorship of the "Archives de Zoologie expérimentale et générale" did much to further the progress of comparative anatomy.

(5) *General Physiology*. On the physiological side there has been no investigator that has surpassed Claude BERNARD (1813-1878) either in the profundity of his researches or in his influence on the progress of physiology. Building upon the work of HARVEY, of HALLER, and of Johannes MUELLER, he broadened physiology and gave to it a distinctly modern aspect. His "Introduction à l'étude de la médecine expérimentale" (1865) establishes his rank as the foremost expounder of experimental physiology. Among his notable researches is the discovery of the glycogonic function, or sugar formation of the liver, one of the first and most complete studies of internal secretions. He also discovered the existence of vaso-motor nerves and experimentally observed their influence in regulating the blood supply to different parts of the body. The first comprehensive treatment of general physiology was contained in his now classic "Leçons sur les phénomènes de la vie communs aux animaux et aux végétaux." He gave a tremendous impulse to physiology, and takes rank with the foremost men of all time who have worked in this field.

Lamarck, Claude Bernard, and Pasteur, who may be said to have opened in biology the broad fields of evolution, physiology, and preventive medicine, represent a triumvirate of strength and ability worthy to stand with the limited number of scientific men who have produced results of the highest value to the intellectual world.

On these broad foundations, which were added to by the productive minds of other nations, the French developed a line of university studies that make a strong

appeal to the student of zoölogy, and we may now give attention to the opportunities that are open to advanced students of this science in their universities.

Opportunities at the French Universities.—The French universities are admirably equipped in personnel and material for training biologists for university positions. The incidental advantages are to be placed co-ordinate with the scientific. To miss the experience of university studies in Paris is to lose “one of the greatest opportunities of the intellectual life.” To a penetrating quality of mind the French university professors generally add finish and refinement in the presentation of the background and of the achievement of scientific investigation. The method of lecturing in France is characterized by thoroughness, lucidity, finish, and philosophical grasp; and contact with these excellent models is invaluable in molding the standard of production as well as of literary form and the art of expression. Nicholas Murray Butler, president of Columbia University, in writing of his impressions as a student in Paris, makes this pertinent observation: “For the first time the Latin spirit came to have definite meaning and reality. It was so different from the Anglo-Saxon spirit as revealed in America and so different from the Teutonic spirit as revealed in Berlin. Somehow it seemed subtler and more refined, more delicate and more highly civilized than either.”

While the opportunities at Paris are alluring, it is undoubtedly a better plan to begin one's student life in France at one of the provincial universities. One is less diverted, and comes more thoroughly into touch with French life; and there is no lack of men of distinction in the various universities outside of Paris. The zoölogical student might do well to start at Montpellier (DUBOSCQ),

a relatively small city, where opportunities for zoölogical instruction are excellent. Bordeaux, Grenoble (LÉGER), Lyon (TESTUT), and Toulouse (LÉCAILLON) also offer especial attractions. The French universities, although not all organized on the same scale of size, are on a parity as regards standards. Some of the universities command a foremost place on account of the presence of men of unusual distinction on their faculties. The student of zoölogy should select his university according to the professors and the facilities for study in the particular phase of zoölogy in which he is most interested. In general, opportunities will be wider in those universities having a medical as well as a scientific faculty.

Zoölogy. To enumerate a complete list of zoölogical courses would be tedious and needless; they are set forth in the various annual catalogues published under the name of "Livret de l'Étudiant." The following is merely an abbreviated list of courses that serves to indicate the range of subjects:

At the Sorbonne, the distinguished professor Yves DELAGE (author of "L'Hérédité et les grands problèmes de la biologie générale," etc.) supervises work in zoölogy, comparative anatomy, and physiology. These zoölogical courses are supplemented by PRUVÔT, HOUSSAY, PERRIER, PEREZ, and others. The complementary work in general physiology is directed by DASTRE (textbook) and general biology is conducted by LE DANTEC. Maurice CAULLERY (exchange professor in 1915-16 at Harvard University) offers courses in embryology and the evolution of organized beings, and also directs a marine station at Wimereux (Pas-de-Calais). Other seaside stations connected with the University of Paris are at Roscoff (DELAGE, Director) and at Banyuls (PRUVÔT, Director).

The Medical Faculty of Paris offers courses in physiology by RICHET ("Dictionnaire de Physiologie") and

LANGLOIS; in anatomy under NICOLAS ("Bibliographie anatomique"); in parasitology by BLANCHARD ("Traité de zoologie") and by BRUMPT; in histology by PRENANT (author of a well-known textbook of embryology); and in comparative and experimental embryology by LOISEL.

At the Collège de France, HENNEGUY offers work in comparative and experimental embryology, and at the Laboratoire de Cytologie courses in cytology. General biology is under the charge of GLEY, and histology of the nervous system under NAGOETTE. In addition should be mentioned the laboratory of histology directed by JOLLY.

At the Muséum d'Histoire Naturelle, there are excellent opportunities for the study of particular divisions of zoölogy, as under PERRIER, comparative anatomy; ROULE, fishes, amphibia, and reptiles; JOUBIN, annelids and mollusks; BONNIER, entomology; TROUESSART, birds and mammals; BOULE, palaeontology.

At the Pasteur Institute, organized for complete instruction in bacteriology, serum pathology, etc., are ROUX, the Director; METSCHNIKOFF (author of researches on inflammation, immunity, etc.); and other distinguished scholars.

Zoölogy has also been enriched by French investigations along special lines of interest giving rise to subdivisions of its larger provinces. There are, for illustration, unusual opportunities for the pursuit of protozoölogy and parasitology, of entomology and palaeontology, especially that part of it that relates to the fossil remains of man.

Protozoölogy and Parasitology.—In regard to unicellular organisms, there has been created the department of protozoölogy with especial reference to pathogenic protozoa, and with this there is often combined the study of internal parasites, forming the subject of parasitology.

In France, F. MESNIL, E. CHATTON, and others, have been leaders. Incidentally, it may be mentioned that until recently there has been associated with the Pasteur Institute LAVERAN, a veteran in the study of pathogenic protozoa, whose demonstration, in 1880, of the plasmodium of malaria marks almost the beginning of work in parasitic protozoölogy. Besides the work at the Pasteur Institute, Raphael BLANCHARD, editor of the "Archives de parasitologie," and member of the medical faculty in Paris, offers courses in parasitology. Microbiology and parasitology are especially provided for at the Universities of Algiers, Montpellier, Nancy, and Poitiers.

Entomology.—In this field, including life-histories, structure, habits and relation of insects to the organic world the French annals show many notable names. On the structural side, comes to mind the famous monograph of STRAUS-DÜRKHEIM, and the investigations of Leon DUFOUR. The late J. Henri FABRE (1823-1915) holds high esteem in the study of the behavior of insects. His ten volumes of "Souvenirs entomologiques" are deservedly world-famous. Many of his books have been translated into English and are widely known. As a successor to this interesting naturalist, cultivating entomology in the same spirit with a more modern direction, may be mentioned Pol MARSCHAL at the Institut Agronomique. The courses in entomology by BONNIER have been already indicated. At the University of Rennes is a Station of Entomology, giving especial attention to insects injurious to vegetation.

Zoölogical Palaeontology.—As already stated, the investigation of extinct animals is properly included in zoölogy, since they were merely the forerunners of living animals, although the study is usually pursued under a separate division of science designated Palaeontology.



GEORGES CUVIER (1769–1832)
(From a painting in the Sorbonne)

zoölogy

While the whole field of palaeontology is illuminating to zoölogists, especial interest has centered about the fossil remains of man that are already throwing so much light on the question of human lineage. MANOUVRIER, of the Medical faculty, BOULE of the Museum of Natural History, and other Frenchmen are eminent in this line. No richer territory for explorations of prehistoric man have been opened than those of Southwestern France in the region of the Dordogne and the Vézère. Boule's many investigations, including his monograph on "*Homo moustierensis*," have aroused the greatest interest, and the student of fossil remains of man will find in France excellent opportunities for observation and instruction.¹

Sundry Subjects. Some special courses of interest to students of zoölogy should be mentioned. Connected with the University of Clermont-Ferrand is a fresh water station devoted chiefly to the biology of rivers and lakes (limnology). Courses in pisciculture are given at Nancy and Toulouse, and at the latter University hydrobiology is especially designated. History of the natural sciences is offered at the University of Lyon, and History of the medical sciences is provided for in the medical faculty of Paris. In addition to the marine stations, mentioned in connection with the University of Paris, are those at Cette, in Hérault (DUBOSCQ, of Montpellier, director); the station of Arcachon, organized for study of the fauna of the Arcachon basin and of the ocean, and connected with the University of Bordeaux; the laboratory of Luc-sur-mer of the University of Caen; the marine laboratory du Portel of the University of Lille; St. Vaast-le-Hougue, connected with the Museum and directed by E. PERRIER; the station of Lamaris-sur-mer, connected with the University of Lyon; and the research station at

¹ [See also the paragraphs on *Palaeontology*, in the Chapters on *Geology* and *Anthropology* in this volume.—ED.]

Endoume, connected with the University of Marseille. L'Institut Océanographique, maintained by Albert the First, Prince of Monaco, possesses an unrivalled laboratory and equipment, and is notable for contributions to the science of oceanography.

Libraries, Museums, Societies, Periodicals. As adjuncts to the pursuit of zoölogy in France are many scientific establishments, such as libraries, museums, scientific societies, and periodicals for the publication of results.

The library facilities of Paris are notable, with the great Bibliothèque Nationale in the lead, possessing more than 3,500,000 volumes and 500,000 pamphlets. The library of the Sorbonne has upwards of 600,000 volumes and the medical library 17,000. University libraries having from 125,000 to 200,000 volumes exist at Lyon, Lille, Toulouse, Nancy, and Montpellier.

Museums of interest to zoölogists are found at Besançon, Bordeaux, Caen, Lille, Lyon, Montpellier, and of course at Paris.

Scientific societies are highly organized and very active in Paris. Many have their separate publications. Among those of interest to zoölogists may be mentioned: "Société anatomique"; "Association française pour l'avancement des sciences"; "Société de biologie"; "Société entomologique"; "Société de neurologie"; "Société zoologique"; etc.

Among the periodicals for the publication of researches of a zoölogical character are to be noted the following: "Archives de zoologie expérimentale et générale"; "Annales de l'Institut Pasteur"; "Archives d'anatomie microscopique"; "Archives de parasitologie"; "L'Anthropologie"; "Bibliographie anatomique"; "Bulletin scientifique de la France et de la Belgique"; "Revue

critique de paléozoologie"; "Revue neurologique"; "Bulletin de l'Institut océanographique"; "Annales de l'Institut océanographique"; etc.

It must be recognized that the French universities afford great opportunities for the training of investigators in zoölogy and all those subjects that are basal to the study of medicine. The distinctive qualities of French instruction are fitted to supply a final polish to the student already trained in the rigorous method of the scientific laboratories. The judgment and the fine feeling of the University professors of France for mental attributes is a stimulus and a direct help in enabling one to improve one's own standards of mental activity and of intellectual production.

APPENDIX I

APPENDIX I¹

EDUCATIONAL ADVANTAGES FOR AMERICAN STUDENTS IN FRANCE; WITH A HISTORY OF THE RECENT CHANGES IN ITS UNIVERSITY SYSTEM

I. PAST AND PRESENT.

It is becoming more generally recognized that, except in special cases, an American student has no need of going abroad to secure what was formerly unattainable at home. At the beginning of the twentieth century the situation of America as regards education is radically different from what it was at the beginning of the nineteenth century. With the rapidity with which changes take place as time goes on, the chances are that the changes that will have taken place at the opening of the twenty-first century will be even more remarkable to contemplate than those which have occurred during the century just closed.

At the beginning of the nineteenth century there existed a strong intellectual sympathy between France and America. Benjamin Franklin, during his ministry in France (1776-1785), had more to do with stimulating this friendly feeling than any other American in those early days. Thomas Jefferson, however, Franklin's successor as Minister to France (1785-1789), was no whit behind his illustrious predecessor in encouraging these relations between the two countries. It was while in Paris that he

¹[By Professor JAMES GEDDES, JR., of Boston University.

This valuable article, containing a history of Franco-American university relations, first appeared in *Bostonia* (October, 1903, January and April, 1904). It was separately reprinted. The first edition was soon exhausted. Owing to repeated calls for the article, it finally appeared in the *Waverley Magazine* (September, October, and November, 1908), the organ of the *North American Teachers' League*. In its final form, the article was thoroughly revised, considerably augmented, brought to date of 1913, and reprinted. By consent of the author, it is here reproduced, with several omissions and a few verbal changes. — Ed.]

conceived the idea of founding an academy of arts and sciences at Richmond, Va., which should have branches in Baltimore, Philadelphia, and New York. But before his plans could be matured the French Revolution interrupted them. Nevertheless, upon his return to America the higher education continued actively to interest him. He corresponded with the French political economist, Dupont de Nemours, upon this subject. The result of this correspondence was that the French scholar published an essay embodying his own ideas in regard to education in the United States. French was then the language of international communication. France had, through her distinguished writers, contributed powerfully to enlarge science. In Jefferson's opinion the only two modern nations whose career deserved to be closely studied were France and England.

The trend of ideas, as shown by Jefferson's attitude, turned gradually but persistently in another direction, towards Germany. The scholarly methods and work of the Germans became appreciated. Edward Everett was the first American to take the degree of doctor of philosophy, at Göttingen, in 1817. His example was followed by such well-known Americans as George Bancroft, Basil Gildersleeve, and William Goodwin. In this country, Yale University was among the first of the institutions of learning to confer this degree, in 1861; Harvard followed in 1875, and Johns Hopkins in 1878. In all of these institutions the reasons for conferring this degree were practically those for which German universities gave it. That is, essentially, that in addition to college instruction the student must have had long training at a university in original investigation and proven his right to be recognized as a master workman by university examination and the publication of some results of original research.

Thus it will be seen that if France and England hold places of importance in the world of science, they are not the only countries whose ways of investigating subjects and accomplishing results are considered worthy of attention. Particularly since 1870, Germany has developed remarkably, both materially and intellectually. During the nineteenth century the prestige of England, due largely to the admirable administration of her colonial possessions, has not failed to receive due recognition. Moreover, the ties of kinship, mutual interests, and common language are factors that must ever attract American students



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toward English university centers. It is, then, to understand why Americans went to the universities of Leipzig, Bonn, and Heidelberg, as well as to Cambridge. The influence of Americans who received their education in German universities and are employed as teachers in institutions of learning throughout the United States is sensibly felt. This is one of the reasons why hundreds of students could be counted in German universities. The inducements held out to foreign students in Germany were attractive. They were hospitably received, and their credentials from an institution whose standards were ordinarily duly matriculated. Two years of serious study in their chosen lines, together with a thesis showing originality and hard work, and the passing of an examination in their field covered, constituted a fair guarantee of recognition as a doctor of philosophy. The value of this degree, when intending to make teaching in his own country his profession, will be disposed to question.

II. THE EFFECT OF CENTRALIZATION

The advantage, in all branches of learning, in France, and especially in Paris, are unsurpassed. Even for Romance studies, our students have gone in great numbers to Germany. There, as has just been said, they received a hearty welcome and advantages of a high order. They were for them to secure a reward in the shape of some position which upon their return home might prove of the greatest assistance in obtaining positions. These advantages were generally speaking, very clearly understood by Americans. Why was it, then, that our students, who during the last few years have known so well how to take advantage of the opportunities offered for study in England and Germany, were attracted towards a friendly country no less distinguished in arts, and sciences than the other two foreign countries?

In the first place, because the organization of education in France has hardly been known. Almost the whole scholastic world has heard of the Université de Paris, of the Collège de France; also, perhaps, of the École normale de France, the École pratique des hautes études, the académies or universités in different parts of France.

Montpellier, Bordeaux, and Grenoble. But just what these institutions are, their relation to the State or to each other, whether they receive foreign students, or if so, whether degrees are granted, were questions not readily answered by those of us not making a specialty of educational topics. The vicissitudes, moreover, through which educational institutions along with everything else in France passed during the French Revolution, have served to make the status of higher education seem more complex than it really is.

The *Université de Paris* still exists, bearing at least the name of the celebrated old seat of learning that came formally into existence about the middle of the twelfth century. A century later, Robert de Sorbon, the chaplain and confessor of St. Louis, founded in the University of Paris a school of theology. This school became one of the constituent parts, and the predominant one, giving its name to the entire theological faculty in the University; and today the University of Paris itself is everywhere familiarly known as the "Sorbonne," although the latter school ceased to exist in 1790. The *provincial universities* in France arose to meet the wants of the districts where they were, at different epochs after the founding of the University of Paris. There were twenty-five of them, of which Toulouse, founded in the first part of the thirteenth century, and Montpellier, in the latter part, were the oldest. The *Collège de France* was founded by Francis I, in 1529. The king believed that the University of Paris was devoting too much attention to some subjects and not enough to others. It was designed to promote the more advanced tendencies of the time and to counteract the scholasticism taught in the University. The *École pratique des hautes études* is a unique institution of comparatively recent origin, dating from the Second Empire (1852).

These names, then, so often heard in connection with the subject of education in France, have indicated institutions whose status was clearly defined and easily understood. Why is it, then, that these establishments do not stand forth clearly cut like Oxford, Cambridge, Göttingen, and Bonn? Both the names of the French universities, as well as the institutions of learning themselves, have a haze about them that is absent from similarly organized faculties of learning abroad.

The principal reason for this vagueness is that at the time of the Revolution the entire system of education was revolutionized. The University of Paris, as well as all the provincial universities,

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was suppressed. The hand of Napoleon then made a new organization. Centralization in education of the day. The universities, originally independent, were consolidated into one great institution, the University of France, of which the Université de Paris and the University of Toulouse, Montpellier, and elsewhere in the provinces were known as académies. The whole system of education was placed under the minister of public instruction, and everything went on automatically and with great precision that it was said the minister could only say what subject was being taught throughout the country at a particular time, but the verb itself that was being carried out in all the schools.

III. RECENT SWEEPING CHANGES THE "UNIVERSITY DEGREES"

Since those times there have been a great many changes covering the entire educational field in France. The colonial expansion and the reorganization of the French Empire, and the educational transformation is the most conspicuous thing the government has accomplished. Characteristic of this is this:

Public instruction has been developed in France and withdrawn as far as possible from the influence of the State. Laws relating to primary instruction have been passed, and elementary education has been made free and obligatory. However, France has awakened to a realization of the need for higher education derived by making her educational centers attractive to students. Before the act of July 10, 1896, higher education was entirely under the control of the minister of public instruction. The act of July 10, 1896, did away with State control of higher education, giving to them the right of their own existence. Thus this act abolished the centralized organization, the Université nationale de France, and restored the académies to their former status of universities. The universities are no longer under State control, for the regulations governing them are made by the University Council, composed of the principal members of the various faculties. The French universities now have a legal standing as independent individuals, and may receive bequests or gifts.

desiring to aid them financially; formerly they could not receive gifts of money.

The innovation that is of most interest to American students is one made especially to attract them, as well as foreign students in general, to the various French seats of learning, the fifteen universities in the different sections of the country. It pertains to degrees, and especially to the doctorate. Formerly the only possible way for a foreigner to secure a French diplôme or degree from any educational institution was by undergoing the same training and passing the same examinations prescribed for a French student. The French diploma confers rights upon the one holding it. For instance, the graduate who has received a degree from the medical school has the right to practice in France; the graduate, likewise, of the school of pharmacy has the right to open an apothecary shop; so, too, the law-graduate has a right to practice law and to aspire to judicial government positions; and the graduate of the different "écoles normales" has the right to give instruction in the institution of the grade for which he has fitted himself. The French student begins at the age of sixteen a series of examinations, the first of which is the baccalaureate, a degree which represents, speaking broadly, attainments somewhat beyond those of our high-school graduates but considerably below those of our best colleges. He then goes on passing an examination yearly until he has reached the age of twenty-four or twenty-five years, when he should pass his final examination for the doctorate. These regulations still hold good for French or foreign students who desire to practice the learned professions in France.

Most foreign students, however, and particularly our own, have no intention of pursuing studies with a view of competing with natives or of profiting pecuniarily by their foreign acquisitions elsewhere than at home. As a rule, American students desire certain advantages procurable by a residence of about two years in the foreign country. They usually have had a college course at home and have no desire to spend nine years in France in order to become doctors in their specialties. Moreover, they can ill afford to spend two years of hard work in a foreign country without having an opportunity at the end of that time to possess a substantial guarantee vouching for the genuineness of their efforts. From the French standpoint, it was not possible for the French institutions to exempt foreign students from the regular course or to credit them with work done in foreign parts, without, in most cases,

giving them an undue advantage over their own students. By any such method, the foreign student could secure a State degree in a relatively shorter time than the native. The problem was to adapt the curriculum to meet the wants of foreign students while preserving intact the rights of French students. This the act of 1896 accomplished, by authorizing the universities to create titles of a different character from the ones conferring State rights or privileges. In no case can the former degrees be considered a substitute for the latter. These new degrees were known as "University degrees," instead of "State degrees."

The different universities in France, in accordance with the act of July 10, 1896, have created doctorates. The regulations pertaining to acquiring this title are made by the university conferring it, but practically the principle governing the bestowal of the degree is the same in all of the sixteen French universities. The State degrees remain as before, open to all foreigners who care to submit to the same ordeal to obtain them as do the native students.

It may now readily be seen that the higher education in France is practically upon the same basis as that in the universities of Germany or at the graduate schools of the well-known universities in our own country. The system governing the reception of foreign students, the splendid advantages offered, and the bestowal of the doctorate by the universities in France, are all along similar lines that in Germany have long proved attractive to Americans. The requirements enabling a student to pursue the courses in any one of the sixteen French universities—fitness shown by examination, or by the presentation of a diploma, or certificate or degree, from a college or school of high standing—are practically the same as those called for in order to pursue courses in any one of the twenty-six universities in Germany. The sixteen French universities, each with four or five faculties (Letters, Law, Science, Medicine, Pharmacy), now stand forth as clearly defined as the twenty-six sister universities in Germany.

The act which has effected the great changes described in the organization of the French educational system, and particularly changed the attitude towards foreign students of all the institutions for the higher education in France, is so important that before going on to speak of the different universities it will be of interest to learn something of the prime movers who brought about modifications so beneficial and so far-reaching.

IV. ORIGIN OF THE RECENT CHANGES.

It seems a little odd that an American who, like many of his countrymen, after finishing his college course in America, had completed his studies in Germany by taking the degree Ph. D. at Halle, should have been the first to bring the matter of reorganization of the higher education in France to the attention of the French authorities. After having made, in 1895, quite a thorough examination of the principal schools in Paris, particularly the Sorbonne, Collège de France, École des hautes études, Mr. Harry J. Furber, a graduate of the University of Chicago (1886), and for a number of years a student abroad and in foreign universities, came to the conclusion that the advantages which it might be possible for American students to procure in Paris were extraordinary. He then asked himself why it was that, notwithstanding, there were but thirty American students enrolled at the Sorbonne, while at the same time at the University of Berlin there were over two hundred. Moreover, if a count were made of all American students pursuing courses in the twenty-six German universities, the sum total of more than a thousand would offer a still more unfavorable and striking contrast for France to the total number of American students enrolled in the latter country's sixteen university centers. As regards the number of artists and sculptors studying in Paris, the sum total of Americans among them proved clearly the superior attractiveness of the French capital to them as an art center over all other places. Mr. Furber realized that if the figures showed in the domain of letters so marked a predilection on the part of American students for German university centers, the inducements offered there in science and letters must be far superior to those offered in France. He then found what has already been shown; namely, that the regulations in force, while doubtless well adapted to the needs of French students, were entirely unsuitable to the wants of foreign students, and particularly Americans. Mr. Furber then drew up a memorial stating the case clearly to M. Poincaré, the minister of public instruction. These ideas, of which a summary has here been presented, were given to the general public in an article published in the *Journal des Débats*, of June 7, 1895, by M. Michel Bréal, a member of the Institute and a professor at the Collège de France. Moreover, M. Bréal made a strong plea for the advantages offered outside of Paris by the provincial universities. Nowhere, he said, could French life in all its intimacy

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and purity be so well studied as in the different As examples of admirably equipped institutions Lyon and Lille; while others peculiarly endow a rare climate and superb physical attractions at Bordeaux, and Montpellier. Were he to begin would be a student nowhere else than at Grenoble beauties of which are so familiar to so many of our he concluded, may well be kept for the last sem crown the foreign student's sojourn in France.

The result of this article from the pen of an educator as M. Bréal was the formation, about of a committee composed of the best known and the educational world in and around Paris.

M. Bréal addressed the meeting, supporting already appeared in print. The discussion was MM. Bonet-Maury, Gréard, Lavis, Maspe Paul Meyer, and Parrot. In the course of the di pathy and encouragement of M. Hanotaux, the affairs, and of M. Poincaré, of public instruction shown by their approval of the plan or form a committee. On the other hand, Mr. Furber v hearty support of His Excellency, the ambassador, for this movement towards closer intellectual States, for this movement towards closer intellectual A commission was then and there (June 26, 1891) study into the question of how to facilitate the entrance of students into French schools, and what inducements early be held out. So important and far-reaching results attained by this commission that it must American students to know who the men are who mental in securing for them such magnificent study as are now to be had at a mere nominal cost. members of the French commission were MM. B fessor in the Theological School; Michel Bréal, Professor in the Collège de France; Bufoir, Professor in the Collège de France; Darboux, of the Institute, Professor in the Collège de France; Girard, then Professor in the École des Chartes; Lav Academy; Levasseur, Professor in the Collège de France; of the Institute; Paul Mellon, Secretary of the Collège de France; Meyer, of the Institute, Director of the École des hautes études; Monod, Professor in the École pratique des hautes études; the Institute, then Director of the École des hautes études

vivantes. The name of the French ambassador to the United States, at that time M. Jules Cambon, was afterwards added to the list.

To coöperate with this commission and aid the members in rendering their efforts as effective as possible, in accordance with Professor Furber's suggestion, the following committee, chosen from distinguished American educators, was appointed: President Angell of the University of Michigan; President Dwight of Yale University; President Eliot of Harvard University; President Gilman of Johns Hopkins University; G. Brown Goode, Assistant Secretary in the United States National Museum; E. R. L. Gould, Secretary of the International Statistical Association; President G. Stanley Hall of Clark University; Wm. T. Harris, U. S. Commissioner of Education; S. P. Langley, Secretary of the Smithsonian Institute; President Seth Low of Columbia College; Simon Newcomb, U. S. N., Superintendent of the Nautical Almanac; President Schurman of Cornell University; Andrew D. White, ex-Minister to Germany; President B. L. Whitman of Columbian University; Carroll D. Wright, U. S. Commissioner of Labor. The commission and the committee together constituted the Franco-American Committee.

Immediately an active campaign to further the common cause was begun by both the members of the commission and those of the committee. In the way of propaganda, one of the best contributions appeared in the *Forum*, New York, May, 1897, from the pen of Simon Newcomb. This article was entitled "France as a Field for American Students." The advantages to be had by the American students at the Sorbonne, Collège de France, and École pratique des hautes études were well set forth. The article appeared before the creation of the degree of doctor of the university; nevertheless, the comparison between the French system then in vogue and the German system is luminous and will repay reading at any time. Another able article, most sympathetically written, and showing the friendly feeling between France and America during critical periods in the history of both, aimed to bring about closer intellectual relations in the immediate future. This article, by Professor Raphael George Lévy, of the École libre des sciences politiques, was published in the *Revue internationale de l'enseignement* for February, 1897. In 1899, the Franco-American Committee, 87 boulevard Saint-Michel, published a pamphlet containing in one hundred and thirty-eight pages a clear account of the system of higher



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education in France, together with the changes and making requirements for the doctorate per se, publication has done much to do away with the hesitation in regard to the status of the French *Comité de patronage des étudiants étrangers*, a *bonne*, issued a luminous pamphlet, entitled: "For the French Universities; doctorate, license diploma studies; for the especial use of foreign students." There appeared in the October number of the *Écho* issued in Chicago, perhaps the best French periodical in the United States, a concise summary of information on the entire subject, with practical hints to aid students for study. This summary was entitled "Conseils aux étudiants" and was written by M. Robert Dupouey of the faculty of California. The substance of this useful article appeared in the *University of California Chronicle* in 1907, and was also separately printed.

There seems now to be hardly any reason why a student coming to study abroad should not obtain quite as clear an idea of the university system in France and the opportunities it offers as he can get from the German university system and its advantages. The writer of the present article mentioned articles, and especially the useful report of the American Committee, the writer of the present article acknowledges his indebtedness.

V. THE UNIVERSITY OF PARIS

Of the sixteen French universities, the University of Paris, the *Sorbonne*, is by far the most renowned. It possesses many of the advantages like those of Salerno and Bologna, that only centuries can give. The most influential scholars have been connected with its teaching force. Of the original structure constructed by Cardinal Richelieu in 1629 for the Sorbonne, the theological faculty of the University of Paris, the portion that has been preserved. Since 1885 extensive operations, only recently finished, have been going on. The University of Paris possesses one of the finest structures for educational needs to be found in Europe. The front of the building is on the rue des Écoles, just opposite the Hôtel de Cluny, the site of the palace and baths of the emperors. The beautiful new home of the University of Paris is the *Sorbonne*.

the seat of the French Academy and of the faculties of Letters, Science, and Theology. The large amphitheater in the interior of the building, where public functions take place, will hold three thousand five hundred persons. This hall contains statues of Sorbon, Richelieu, and Rollin, who so identified themselves with the university, and of the eminent French scientists, Descartes, Pascal, and Lavoisier. At the end of the hall is the celebrated painting *The Sacred Grove*, by Puvis de Chavannes. Other portions of the interior of the Sorbonne are beautifully decorated by celebrated artists.

At the five faculties constituting the University of Paris, law, letters, science, medicine, and pharmacy, the total number of students registered and in attendance at the courses during the year 1906-1907 was 15,789. The lectures are free to the public. In some cases in which the subject itself or the lecturer is popular, the halls are apt to be crowded, and to obtain a seat it is necessary to be on hand early. The courses in literature are much frequented by ladies. This fact has been made the subject of much good-humored pleasantry by French writers. In Edouard Pailleron's comedy, *Le Monde où l'on s'ennuie* (which was very successful and now belongs to the répertoire of the Comédie Française) the author has amusingly set before the public the kind of fetich worship offered to a popular professor by his fair constituency. There are, besides the free lectures, courses called "cours fermés," where the personnel is restricted to the competency of those desiring to pursue them.

As regards impartiality in granting equal advantages to men and women, as well as liberality in offering educational opportunities that are almost absolutely free of expense to all, France is unsurpassed by any other nation. The function of offering examinations and giving degrees is kept rigidly distinct from that of offering instruction. The student pays for the former, but the latter is, save in rare instances, absolutely free.

Inasmuch as the department of science is strictly separated from that of letters, the courses given at the Faculty of Letters will be found to be much along the lines laid down in the catalogs of American universities and applicable to the courses given in the college proper, omitting those devoted to the sciences and mathematics. In brief, they consist of culture studies, and largely of those so highly esteemed of old, and which, coming down through the ages, still hold their own amid the multitudinous subjects that are claiming recognition because of rapid changes in civilization.

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These long-accepted and cherished Greek, Latin, French, Foreign Economy and Sociology, all of relations to allied topics; in a way in the broadest possible sense. the curriculum of American colleges to which much attention is given French universities. Like the courses, it is gone into very thoroughly modern, ancient, physical, colonial, political Economy and Sociology faculty of letters of the University of in the law-school course. It is a subject is almost wholly pursued in universities. French Literature, philosophy appear to be the centers directed. It is undoubtedly due to France has in the past produced historians, and *littérateurs*. This certainly appears sensible from a seem to be a duty to be well informed concerns one's native land and to its borders.

Besides the ancient language and philology receive a good Comparative Grammar of the Indo-European under some of the foremost scientific. European literature, and of the best in the field in northern appears to be laid rather on the the philological. This feature in some of the higher institutions where the emphasis is rather on language than on the literary. The most time and attention are given German and English, fully warranted, generally speaking, is a in the courses offered by and for the study of which Paris surpassed. American Institutions recent years been given a place.

The Faculty of Sciences at the University of Paris embraces purely scientific subjects. They are treated widely in all their many phases, just as letters are in the Faculty of Letters. The subjects pursued are: Astronomy, Botany, Chemistry, Geology, Mathematics in all the higher branches, Mechanics, Mineralogy, Physical Geography, Physics, Physiology, and Zoölogy. No subjects, for instance, like Language, Letters, or Political Economy, such as are taught at the Massachusetts Institute of Technology, more or less in connection with work in science, are found on the program of studies of the Faculty of Sciences. The former subjects are considered as belonging to the department of letters, and to this latter faculty, consequently, they are relegated. The prominence given now in some of our scientific schools to Engineering, Architecture, and Landscape Architecture is due to the development of these subjects in recent years in this country. Although these topics are not to be found on the program of the French faculties of science, the subjects themselves have long received the most careful attention in French technical schools.

The Faculty of Law of the University of Paris offers about forty courses given by as many different professors. Compared with the courses given in our law schools of good standing, the Paris courses are not so technical, and, speaking broadly, have considerable more educational value. There are no less than fifteen courses on political and economical science, a number of which, like Comparative Social Economy, Public International Law, History of Economic Doctrines, are of much general interest and value. Judging by the program of courses recently made at the Boston University School of Law, that is, the introduction of courses on International, Colonial, and Consular Law, it would appear that in the future more such courses as are offered abroad, and which are of educational value to all, are likely to be given in our law schools here. The impetus in this direction is in a large measure due to national expansion.

The courses offered by the Faculty of Medicine are similar to those that appear on the programs of our best medical schools. About sixty professors give as many courses either at the school itself, in the Place de l'École-de-Médecine, or at various hospitals in the city. As pointed out in comparing the announcement of the law-school courses with similar ones in this country, the French medical schools likewise may possibly offer a few more popular or less technical courses than can be found in the American schools of

medicine. At least the subjects of some of the courses, Hygiene, Physiology, Biological Physics, and Biological Chemistry, suggest courses of educational value that may not be and probably are not intended exclusively for specialists.

The studies pursued at the *École supérieure de Pharmacie* are Analytical Chemistry, Galenic Pharmacy, Mineral Chemistry, Natural History of Medicaments, Physics, Zoölogy. Over a year of study is required at the school, and finally the presentation of a thesis containing personal research, which the candidate for a degree is called upon to elucidate.

As already stated, there is no longer a sixth faculty, that of the *École de Théologie protestante*. The courses, however, at this school continue to be given by ten professors, and are similar to those laid down in the curricula of many Protestant theological schools in this country. They include Ecclesiastical History, Evangelical Ethics, German, History of Philosophy, Lutheran Dogma, New Testament, Old Testament, Organization of the Reformed Churches in France, Patristics, Practical Theology, Reformed Dogma, Revelation, and Holy Scripture.

VI. THE PROVINCIAL UNIVERSITIES.

The fifteen universities outside of Paris and in the different sections of France are Aix, Algiers, Besançon, Bordeaux, Caen, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Poitiers, Rennes, Toulouse. As their curricula are modeled in a measure upon that at the University of Paris, no detailed description of them is necessary. None of them possesses, for obvious reasons, the unrivaled opportunities found at the University of Paris. Nevertheless, by this is not implied that they are lacking in attractiveness either of natural or intellectual resources. Indeed, the natural attractions of many of these institutions appeal to many more strongly than the city advantages of Paris. With the exception of the universities of Besançon and Clermont-Ferrand, which have only the three faculties, Letters, Science, and Medicine, the remaining provincial universities have four faculties: Law, Letters, Science, and Medicine; or five, counting the schools of Pharmacy, usually comprised in the medical schools. Toulouse had, like the University of Paris, before the law of December 9, 1905, of separation of church and state, a faculty of Protestant Theology. The universities of Bordeaux, Lille, Lyon, Montpellier, Nancy, and

Toulouse are among the most important, by reason of their equipment and advantages, of the provincial universities. Some of the others, however, have in some respects advantages superior to any one of the six just named.

It is possible, too, that each one of these university centers, by reason of its situation, or of particular circumstances, may possess, and probably does possess, superior advantages to any other for pursuing special branches. Thus, because of the fine laboratories, extensive collections, agricultural stations, botanical gardens and museums in Bordeaux, Agriculture, Natural Sciences, and Chemistry applied to industry are all especially studied. Among the courses at the Faculty of Letters serving to differentiate the curriculum from that offered by other institutions are found: History of Bordeaux and the Southwest of France, Language and Literature of the Southwest of France, Hispanic Studies. The University of Lille, in the ancient capital of Flanders, near the Belgian frontier, possesses very fine material as well as intellectual equipment. Among the courses at the Faculty of Letters, one will hardly fail to note, because not found elsewhere, Walloon and Picardy Language and Literature. The situation of the university in the heart of the Walloon district is in itself an advantage in pursuing this specialty such as no other university possesses. The University of Lyon, in one of the finest cities in France, not far from Switzerland, possesses exceptional advantages for the study of Archaeology. Industrial and agricultural Chemistry holds an important place among the sciences. The influence of the silk industry, as well as of the metallurgic industry of the region, is traceable among the courses offered by the faculty of science. The study of Psycho-physiology is one of the specialties of this university. In the department of letters a course on the History of Lyon is noticeable. The University of Montpellier is a most active intellectual center. The Faculty of Medicine, to which Rabelais belonged, and added lustre by his efforts in its behalf, still retains its ancient prestige. The Jardin des plantes is one of the finest in Europe. It contains a great number of rare trees and plants. Botany and Natural Sciences are among the most popular studies at Montpellier. Moreover, the Comité de patronage des étudiants étrangers has recently issued a circular from the Université de Montpellier, announcing that during the winter semester of 1908-1909, courses adapted particularly to foreign students will be offered. The program, embracing subjects in French, Italian, Spanish, and Romance Philology, appears very attractive. Among



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the courses in letters at the University of Nancy, capital of Lorraine, are to be noted one on German and other on History of the East of France.

At the University of Toulouse, in the ancient capital, more attention is given by the Faculty of Letters to the Spanish language and literature than elsewhere. The annual competition on the subjects of poetry and prose still takes place in Toulouse, pleasantly commemorating the Jeux floraux, instituted there in 1323. At the University of Caen, situated in the very heart of Normandy, more importance than those just named, courses in French literature can be found which do not appear at all elsewhere. In the University of Provence, not far from Marseilles, the Faculty of Letters offers a number of general fine courses on Provençal History, Language and Literature. The University of Caen, situated in the very heart of Normandy, offers a course on Norman Art and Literature, which is of considerable interest to students of art and history. At Grenoble, in the midst of the Alps, not far from Italy, the University is situated, possessing the warmth of a southern sun and the coolness of the mountains. There is an Italian course at the Faculty of Letters offers a course in Italian Language and Literature, a subject not found upon the curriculum of letters, excepting Clermont-Ferrand, which is farther away from the immediate vicinity of Italy. At the University of Geneva for pursuing science, especially geology and botany, the courses are very fine. The summer courses, together with the attractions of Grenoble, are beginning to attract a large number of foreign students. Through the initiative of the Association of French Universities now making a vigorous campaign at home and abroad for the interest of French language and letters, holiday courses are now being given in Bordeaux, Boulogne-sur-Mer (in connection with the University of Lille), Saint-Malo-Saint-Servan (in connection with the University of Rennes), and Villerville-sur-Mer. A number of courses and schools in France and Switzerland have joined together to present either independently or in connection with the University of Geneva. Courses are announced for the summer season of 1901 at Caen, Dijon, Grenoble, Lyon, Nancy, all provincial centers, at Lisieux, Bayeux (both in Calvados, Normandy), at the Institut-Moderne, Marseilles, and at the Lycée for the study of French under the direction of Mme. Kahn; also at the University of Geneva, and Lausanne, and at the Academy of Letters in Switzerland.

The University of Clermont-Ferrand, in the capital of the old province of Auvergne, in the center of Southern France, like Grenoble, is in the midst of the mountains. Clermont is the center of a most important volcanic region and possesses unique interest not only for geologists and mineralogists, but for geographers as well. The University of Dijon, in the town of that name, capital of the old province of Bourgogne, offers a course on the History of Burgundy; the University of Poitiers, in the old province of Poitou in Western France, where famous battles occurred in olden times, offers a course on the History of Poitou; the University of Rennes, in old Bretagne, offers a course in Celtic Language and Literature; the University of Besançon, in Franche-Comté, of which Besançon was the capital, a course in Russian; also one on the History and Geography of Antiquity and the Middle Ages, in which epoch Besançon played an interesting part.

It will now be clear that while the provincial universities offer courses in law, letters, science, and medicine quite similar to those described as given by the University of Paris, they make up in a measure for what they lack in variety by offering special courses, for which they have advantages superior to any that can be found elsewhere. The law-school courses are in many cases broadly educational as well as technical. The scientific courses are thoroughly practical, as the names of some of them suggest: Industrial Electricity, Industrial Chemistry, Industrial Physics. The medical schools are the equal in excellence of the schools of law, letters, and science. The provincial universities, following the example of the University of Paris, are gradually introducing the doctor's degree for foreign students into their various faculties. An American student who desires to receive this degree as a recompense for successful work in France will have in the future only the perplexity of deciding where he can most advantageously spend his time.

VII. SPECIAL SCHOOLS FOR HIGHER EDUCATION.

It remains to speak of several institutions, some of which are not connected with the government, of no less interest to American students than those just described. Many of these are termed "*écoles libres*," *libre* being used here in the sense of independent, and not, as sometimes supposed, of *free* in the sense of tuition free, although such is often the case.

EDUCATIONAL ADVANTAGES I

First in importance is the *Collège de France* the portals of which is seen the inscription science and letters in their most advanced stage than forty of the ablest specialists in France. Gaston Paris was administrator of the institute; leagues in their specialties are well known to searches in like fields everywhere. Some of those whose visits to America or whose writings have been particularly well known to men of letters in this country are Bédier, Michel Bréal, Gaston Deschamps, Janet, Leroy-Beaulieu, E. Levasseur (who succeeded as administrator of the Collège de France), A. Caro, Paul Meyer, Morel-Fatio, A. Réville, Georges

Very similar in its aims is the *École pratique de la Sorbonne*. Over one hundred professors have been constructed. The school is divided into five sections: 1° history, language, and philology; 2° mathematics and mathematical sciences; 3° physics and natural sciences; 4° natural sciences; 5° religious sciences. Complete liberty in regard to pursuing one's chosen course. Each professor meets his students when and where it is convenient and continues his work with them for as long as it can be deemed practicable. Each student may be assigned to any particular part of a subject, in which case the students come together by appointment, and carry on their work in whatever manner they may consider most profitable. Examinations are given nor are any degrees conferred. This school in Europe stands higher in its field or is more favorably known than the *École pratique des hautes études*.

The *École des langues orientales vivantes*, 27 rue de la Harpe, is perhaps one of the best known of the kind. It is devoted to teaching oriental living idioms. The professors are native speakers of the languages. The students pursuing the course are for commercial, or philological reasons. Quite a number of graduates are employed as interpreters in eastern countries.

The *École nationale des chartes*, 19 rue de la Harpe, founded over eighty years ago, is frequented by specialists in paleography, philology, history, and diplomacy. They come from all over the world, attracted by the unrivaled resources of the library. The advantages, particularly for the study of paleography, and the abundance of rare manuscripts, are unsurpassed.

The *École libre des sciences politiques*, 27 rue Saint-Guillaume, fulfills a most useful mission. Here an excellent preparation can be had for the various administrative careers in the government, in conformity with the five sections composing the entire program: 1° interior administration; 2° finance; 3° political and social economy; 4° diplomacy; 5° law and history. There are no examinations to enter. A course can be taken for two or three years. A diploma is given when evidence is shown of good ability to investigate problems. There is an enrollment fee of \$14.00 a year.

Social doctrines may be profitably pursued at the *Collège libre des sciences sociales*, 28 rue Serpente. Of such institutions as the *Muséum d'histoire naturelle*, 57 rue Cuvier, where courses are given in zoölogy, anthropology, and kindred subjects; the *École nationale supérieure des mines*, 60 boulevard Saint-Michel, for the training of mining engineers; the *Écoles des ponts et chaussées*, 292 rue Saint-Martin, for bridge-builders and constructors; the *Conservatoire des arts et métiers*, 292 rue Saint-Martin, for sciences and their industrial application, in all of which the instruction is absolutely free, nothing need be said other than that they represent the best modern types of the kind. Such schools as the *École nationale et spéciale des beaux-arts*, 14 rue Bonaparte, for the study of painting, sculpture, architecture, and allied subjects, and the *Conservatoire nationale de musique et de déclamation*, 15 rue du Faubourg-Poissonnière, for vocal and instrumental music and the study of the voice, will long continue to attract, as in the past, foreigners from distant countries.

It is perhaps needless to say that the mere enumeration of special schools that offer the foreign student as well as the native a most attractive program of studies, either entirely free or at a nominal cost, would make a long list. It must here suffice to note two well-defined advantages that American students of art and language may profit by, if disposed to make use of them. The American Art Association has over two hundred members. Its function is that of a club. It gives opportunity for American students and artists to meet together informally and enjoy each other's society. The Association now possesses fine quarters at No. 2 Impasse Conti. A large art library, fine reading rooms, recreation-halls, and a good but inexpensive restaurant contribute to the comfort of the members. The club is somewhat like the St. Botolph, in Boston, in that art exhibitions are held in the rooms quite frequently. It is well

worth while for a student of art, intending to remain a year in Paris, to become a member immediately upon arriving. The fees are ten francs initiation and twenty francs membership annually.

The second advantage is that offered during the summer months by the *Alliance Française*, 186 boulevard Saint-Germain, to students of the French language. Two series of courses are given, the first during the month of July, and the second during the month of August. Students are able to secure diplomas at the end of the course after an examination upon it. The fee for either course, which embraces, besides a large amount of instruction, lectures, etc., many desirable privileges, is twenty dollars. The Alliance has been wonderfully successful in Paris, and hundreds of students and teachers pursue these courses yearly. This success has encouraged the projectors of the movement, aided by the government, to start a similar movement in the nature of a propaganda outside of France. The object is to encourage the pursuit of the French language and literature and to attract favorable attention to France. Some idea of how successful the movement has been in this country may be got from the fact that at the present time there exist here and in Canada more than two hundred Alliances Françaises, or branches, groups, as they are called, of the central organization in Paris. Moreover, some of these groups are very flourishing, the one in Boston, for instance, having annually for several years more than four hundred members. This group in particular has been very ably managed by Professor de Sumichrast since taking charge of its interests in 1900. Lectures and entertainments in French, all of a high order, are given fortnightly. During the years 1901, 1902, and 1903, the Boston group, at its own expense, sent over to Paris, each summer, a teacher in the public schools to enjoy the advantages offered by the Alliance in Paris. It is well to be familiar with the work of the Alliance Française when preparing, whether here or abroad, to make a study of French life, literature, and language. In this way it is quite possible to keep abreast of what is going on in a rather extensive circle of French interests. Both Frenchmen and Americans of distinction are connected with the organization, and directly or indirectly may be of signal service to a student. Perhaps the simplest way to get posted quickly is to send for the *Bulletin officiel de la Fédération de l'Alliance Française aux États-Unis et au Canada*, 1402 Broadway, New York City.

VIII. L'ENTENTE CORDIALE.

It is beginning to be quite evident that the day is past when thoughts, ideas, and the possession of truth are national and the property of one particular people. The tendency of this generation is fast towards denationalization. Foreign methods when proved to be better than our own are no longer looked upon askance because they are foreign, but are beginning to be adopted; just as abroad practical American ideas have found widely a favorable reception. The intrinsic value of ideas is an asset too precious to be long ignored by any wide-awake nation.

In 1897, Ferdinand Brunetière gave a course of lectures in French at Johns Hopkins University which were notable and besides attracted popular attention. He was invited to Harvard University, where he gave three lectures on Molière. The charm and magnetism of the man will not easily be forgotten by anyone privileged to hear him. Since that time the French lectureship fund provided by Mr. James Hazen Hyde of the Class of 1898 has made it possible for Americans to pass in review a long line of distinguished French men of letters; for not only have these gentlemen lectured at Harvard University, but after finishing their course there, usually have also lectured in many places in the United States and Canada. The distinction of the lecturers and the variety of the topics treated has naturally called attention to France, a country for which American sympathy has been strong and lasting from old colonial days. The following are the names of the eminent lecturers who have visited our shores and their subjects:

- 1898. René Doumic: *Histoire du romantisme français.*
- 1899. Edouard Rod: *La Poésie dramatique française.*
- 1900. Henri de Regnier: *Poésie française contemporaine.*
- 1901. Gaston Deschamps: *Le Théâtre français contemporain.*
- 1902. Hugues Le Roux: *Le Roman français et la société française.*
- 1903. L. Mabileau: *Idées fondamentales de la politique française.*
- 1904. A. Leroy-Beaulieu, de l'Institut: *Christianisme et démocratie.*
- 1905. René Millet, ambassadeur: *La France et l'Islam dans la Méditerranée.*
- 1906. Anatole Le Braz: *La France celtique.*

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1907. Vicomte G. d'Avaux.
France.

1908. André Tardieu: La France.

1909. Abel Lefranc: Molière.

Nearly all of these men have had impressions of American life in their own lives, and have been able to give a picture in familiarizing themselves with the broadening effect upon their own minds. Moreover, under the auspices of the Ministry of Education, and possibly, at times, independently, André Michel, F. Funck-Bretan, Bonet-Maury, Marcel Poète, and others, have lectured in various parts of the country. Distinguished Italians, Angelo d'Annunzio, Ferrero, have also addressed meetings.

So much activity on this side of the Atlantic has been the result of the social movement in France. In the case of Mr. Hyde, who has done so much for understanding between France and America, Wendell, of Harvard University, has given lectures on American literature in university towns in France. Students will do well to profit from Professor Hyde's book, "The France of Today." A. C. Coolidge, and he in turn has been a student of Harvard University.

Of late years a number of our leading universities, and many of our leading professors, have given instructions and lectured in France. This idea of foreign students coming to America has been favorably received. In 1896, for the first time, the University of Paris, Charles Cestre, was the first to give a contribution by him on the French side. The Harvard Graduates' Magazine, in 1903-1904, published a special issue on l'Université Harvard with a special issue on Mr. Hyde and has been since then a regular feature. The fellow is selected by the Ministry of Education. According to the conditions of the law, a man is expected to give a certain

ment of French and other Romance languages. He is also to be admitted to any courses of instruction in the university he is qualified to pursue. These young men occasionally assist in the annual production of the Cercle Français play. The appointment of the American exchange fellow to Paris, to benefit by the fellowship offered in return by the French ministry of public instruction, is made on the recommendation of the president of Harvard University. The incumbents have been George Wallace Umphrey, 1903-4; Robert Bell Michel, 1904-5; Charles Marshall Underwood, 1905-6; Arthur Fisher Whitem, 1906-7; Warren Barton Blake, 1907-8; Samuel Montefiore Waxman, 1908-9. The same conditions govern the incumbent of this fellowship as those of the James Hazen Hyde fellowship offered by the Cercle Français. The "boursiers," or fellows from France at Harvard, have been Robert Dupouey, 1903-4; to whose article, Americans in French Universities, reference has here twice been made; Henri Baulig, 1904-5, now an instructor in French in Harvard College; Médéric Tournier, 1905-6; Edmond Jean Egli, 1906-7; Jean Marie Giraudoux, 1907-8; Maurice Chelli, 1908-9.

About fourteen years ago, Baron Pierre de Coubertin made four foundations for the study of French literature; one each at Princeton, Tulane, the University of California, and Leland Stanford. By way of reciprocity, there are now the University of Paris: 1° The duc de Loubat's foundation at the Collège de France for the study of American antiquities. The late Léon Lejeal used to lecture in this course. 2° Mr. James Hazen Hyde's foundation at the Sorbonne for the study of America, American Ideas and Institutions; lectures in English by the American exchange lecturer. 3° The proposed foundation by some American bankers and financiers at the law-school of the University for the study of the History and Outline of American Law; lectures in French, in 1904-5, by Charles F. Beach, Jr., a noted American lawyer and student of economic problems.

Perhaps one of the best known of all the foreign traveling fellowships is the Bourse du Tour du Monde, founded by Albert Kahn in 1898. This bequest provides for sending around the world "Cinq jeunes agrégés de l'université," each on a fellowship of \$3,000. An account of experiences in foreign countries by thirteen of these young men during the years 1898, 1899, and 1900, will be found in "Autour du monde, par les Boursiers de voyage de l'Université de Paris" (Paris, Félix Alcan, 1904). The book is useful in giving

the American student who studies abroad an excellent French point of view. Occasionally one of these graduate Frenchmen remains in a foreign country some years, as in the case of M. Louis Allard, who taught and lectured a year or more in Laval University, Quebec, and for the past two years has been one of the regular instructors in French in Harvard College. This year (1908) a young woman, Mlle. Elichabe, is one of the holders of the Around the World Fellowship. Her lectures in different parts of the country have been noteworthy.

A few of the largest and best-endowed institutions of learning in this country, such as those already named, are well provided with traveling fellowships. The catalogs of a number of our colleges call particular attention to such special advantages; at Boston University, for instance, the Ada Draper fund of \$25,000, the income of which is to be applied "to enable the most meritorious and needy student among the young women to be sent to Europe after graduation to complete her studies." In this way students, sure of their future, are able to concentrate their whole time and thought on the main object of their foreign residence.

Thus, from what has been shown, the signs of the times seem to point not only to a mutual desire on the part of France and of this country to bind more cordially together the old intellectual ties of sympathy that were so strong in the days of Franklin and Jefferson, but to a common world understanding that shall ultimately do away with intellectual barriers between nations. That a movement so thoroughly in accord with the best spirit of the times should be fraught with success is the earnest hope of all who desire the moral and intellectual advancement, not only of France and America, but of all civilized nations.

APPENDIX II

APPENDIX II¹

INSTITUTIONS OF HIGHER LEARNING; THEIR ORGANIZATION, DEGREES, REQUIREMENTS, FEES, ETC.

Offices Furnishing Information to Foreign Students. From the beginning of the thirteenth century, when the University of Paris was founded, till the present day, France has always generously extended to the whole world the hospitality of her schools of higher learning. This hospitality has been eagerly accepted in modern as well as in mediaeval times, as is evidenced by an enrollment on January 15, 1913, of 5560 foreigners in the Faculties of the French Universities, nearly a seventh of the entire student body.

In order to emphasize this hospitality and render it concrete, the French educational authorities have organized two offices or bureaus whose business it is to facilitate in every possible way the pursuit of studies in France and to render any service possible to the prospective or resident foreign student. These offices are: *Bureau des Renseignements*, at the Sorbonne, and *Office National des Universités et Écoles Françaises*, 96 Boulevard Raspail, Paris. The Bureau of Information publishes annually the "Livret de l'Étudiant" of the University of Paris, which also contains a complete detailed account of all the other institutions of higher learning in the capital. The National Office of French Universities and Schools publishes a Handbook which presents in schematic outline a description of the organization, conditions of admission, etc., of all the higher schools, not only in Paris, but also in the provinces. The information contained in the following pages has been reproduced for the most part from these two booklets, which should be consulted for further details. Each University also publishes a "Livret de l'Étudiant" or "Annuaire" which gives an even more detailed account of the particular University and of all

¹[Prepared by Professor C. B. VIBBERT, of the University of Michigan.—Ed.]

the higher schools in the administrative educational district (Académie) in which the University is located.¹

Each University has also established a committee which seeks to promote in every possible way the interests of foreign students ("Comité de Patronage des étudiants étrangers"). The student is strongly advised to supplement the necessarily limited information contained in the following pages by consulting these various handbooks, and, in case of doubt on any point, to apply directly to one of the two bureaux of information indicated above, or to the Deans of the various Faculties or the Directors of the various Schools, or to the several Committees of Patronage.

The educational data to be described for the intending American student in France can best be grouped under the following headings:

- I. Organization of the Various Institutions of Higher Learning:
 1. The Universities.
 2. Other Institutions.

¹ For further information upon the Universities of France, and upon the educational system, consult the works in the following list, prepared by Professor ROLLO W. BROWN, of Wabash College, at the request of the Editor of this volume:

E. Delalain: "Annuaire de l'Instruction publique." (Librairie Delalain Frères, Paris.) This volume not only serves as a directory of the French universities, but provides a convenient view of the entire scheme of French education.

L. Liard: "L'Enseignement supérieur en France." (Armand Colin, Paris. Two volumes.) A very complete and a thoroughly sound historical study of French higher education, by the head of the University of Paris.

H. Vuibert: "Annuaire de la Jeunesse." (Librairie Vuibert, Paris.) This volume is indispensable to the American student who wishes to be informed on French educational organization. Ordinarily it contains more than a thousand pages of well-indexed material.

Few books have been written in English on French education, and most of these have dealt chiefly with the primary (utilitarian) or secondary schools. The following volumes will help the student to form a notion of some aspects of French educational methods and spirit:

English Board of Education: "Special Reports on Educational Subjects." (Wyman and Sons, London.) Volumes 2, 18, and 24. Volume 2 is devoted in part to French universities; volume 18 discusses the primary schools; and volume 24 deals exclusively with the secondary schools.

Frederic Ernest Farrington: "The Public Primary Schools of France." (Columbia University Press.) Same Author: "French Secondary Schools." (Longmans, Green and Company.) These two books give a complete account of French education below the university.

A. L. Guérard: "French Civilization in the Nineteenth Century." (Century Company.) Chapter VII gives a brief historical view of French education.

Rollo Walter Brown: "How the French Boy Learns to Write." A study in the teaching of the mother tongue. This volume acquaints the student with present-day French methods of teaching language and literature.

INSTITUTIONS, DEGREES

- II. Degrees, Diplomas, and Certificates of Universities.
- III. Admission to the Universities.
- IV. Credit allowable for Equivalent Institutions.

I. ORGANIZATION OF THE VARIOUS HIGHER LEARNING

Classes of Institutions. All institutions of France may be divided into three great groups, principles of their inner organization:

I. The *National Universities*, under the direction of the Minister of Public Instruction, which confer the main degrees required in France for learned professions;

II. (1) Other *National Schools*, under the direction of the Ministry of Public Instruction or other ministries, which are either devoted primarily to prepare for the various lines of specialization or to various services;

(2) *Independent Institutions*, established privately and supported by private gifts and endowments, and variety of the activities of these independent institutions.

I. THE UNIVERSITIES.

There are sixteen French Universities, scattered throughout France, each having its seat in the city which is the official center of an "Académie." These are divided into administrative districts, into which are grouped for the organization and direction of education, several "départements," each under the direction of a "Recteur."

The sixteen French Universities are, besides the cities of *Aix-Marseille, Alger, Besançon, Bordeaux, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Rennes, Toulouse.*

These Universities have for the most part a glorious past; some of them, as the Universities of *Paris, Montpellier*, are among the oldest in the world. O

actual organization of the Universities as it exists today is very recent. It dates from a law of July 10, 1896, which, grouping together the various isolated and independent Faculties and Schools existing at the seats of the various administrative educational districts, organized them into Universities.

The work of the Universities is comprised under the four Faculties of Law, Medicine, Sciences, and Letters, and the Higher School of Pharmacy. However, not every University possesses all of these five establishments. But, in whatever University they are found, the Faculties or Schools are of the same type and offer essentially the same lines of instruction.

The "Facultés de Médecine" and the "Écoles supérieures de Pharmacie" provide complete instruction for the degrees of doctor of medicine and registered pharmacist, and also offer full opportunities for research along these lines. In some of the Universities the work along these two lines is combined into one school, the so-called "Facultés mixtes de Médecine et de Pharmacie" and the "Écoles de plein exercice de Médecine et de Pharmacie." Other Universities offer only the first three years of studies out of the five required for the official degrees in medicine and pharmacy, in the so-called "Écoles préparatoires de Médecine et de Pharmacie."

The "Facultés de Droit" are devoted not only to research and instruction in the legal sciences, but also in the economic sciences, such as political economy, finance, administration, etc.

The "Facultés des Sciences," especially devoted to the mathematical, physical and biological sciences, offer instruction and research in both pure and applied science.

Finally, the "Facultés des Lettres" give full instruction and offer opportunities for research in philosophy, languages, philology, history, geography, pedagogy, etc. A certain number have also organized for the benefit of foreigners special courses in French literature, philology, and phonetics, which are given either during the regular school year or during the summer vacation.

"*Instituts*" and "*Écoles*." In a number of Universities the courses already offered, or the laboratory work already carried on has been specially organized and co-ordinated with reference to the achievement of certain special ends in pure science or in the application of knowledge to special technical or practical purposes. The courses so organized constitute the various "*Instituts*" and "*Écoles*," attached to the various Faculties to which they are related. The Universities in which they are organized grant

various degrees and diplomas in recognition of the work successfully completed in these special schools.

In order to present a synoptic picture of the various Faculties, Institutes and Schools which are comprised in each University today, we have given below a list which is reproduced from the Handbook of the Office National des Universités:

UNIVERSITÉ DE PARIS.

Faculté de Droit.
Faculté de Médecine.
Faculté des Sciences.
Faculté des Lettres.
École supérieure de Pharmacie.
École normale supérieure.
Institut de Chimie appliquée.
Institut aérotechnique.
Institut de Médecine coloniale.
Institut de Médecine légale et de Psychiatrie.

UNIVERSITÉ D'AIX-MARSEILLE.

Faculté de Droit (à Aix).
Faculté des Sciences (à Marseille).
Faculté des Lettres (à Aix).
École de plein exercice de Médecine et de Pharmacie (à Marseille).

UNIVERSITÉ D'ALGER.

Faculté de Droit.
Faculté mixte de Médecine et de Pharmacie.
Faculté des Sciences.
Faculté des Lettres.

UNIVERSITÉ DE BESANÇON.

Faculté des Sciences.
Faculté des Lettres.
École préparatoire de Médecine et de Pharmacie.

Cours spéciaux de français pour les étrangers (Cours annuels et Cours de vacances).

UNIVERSITÉ DE BORDEAUX.

Faculté de Droit.
Faculté mixte de Médecine et de Pharmacie.
Faculté des Sciences.
Faculté des Lettres.
École des hautes études hispaniques de l'Institut français de Madrid (Espagne).

Institut colonial.

École de Chimie appliquée à l'industrie et à l'agriculture.

Institut pratique de Droit.
Cours spéciaux de français pour les étrangers (Cours annuels et Cours de vacances).

UNIVERSITÉ DE CAEN.

Faculté de Droit.
Faculté des Sciences.
Faculté des Lettres.
École préparatoire de Médecine et de Pharmacie.
Cours spéciaux de français pour les étrangers.

UNIVERSITÉ DE CLERMONT-FERRAND.

Faculté des Sciences.

- Faculté des Lettres.
 École préparatoire de
 Médecine et de Pharmacie.
UNIVERSITÉ DE DIJON.
 Faculté de Droit.
 Faculté des Sciences.
 Faculté des Lettres.
 École préparatoire de
 Médecine et de Pharmacie.
 Institut pratique de droit.
 Institut œnologique et
 agronomique.
 Cours spéciaux de français
 pour les étrangers (Cours
 annuels et Cours de
 vacances).
UNIVERSITÉ DE GRENOBLE.
 Faculté de Droit.
 Faculté des Sciences.
 Faculté des Lettres.
 École préparatoire de
 Médecine et de Pharmacie.
 Institut français de Florence
 (Italie).
 Institut polytechnique
 (Institut électrotechnique
 et École de Papeterie).
 Institut des Sciences
 commerciales.
 Institut de Phonétique.
 Institut de Géographie
 alpine.
 Cours spéciaux de français
 pour les étrangers (Cours
 annuels et Cours de
 vacances).
UNIVERSITÉ DE LILLE.
 Faculté de Droit.
 Faculté mixte de Médecine
 et de Pharmacie.
 Faculté des Sciences.
- Faculté des Lettres.
 Institut français de Londres
 (Angleterre).
 Institut pratique de Droit.
 Institut électrotechnique.
 Institut de Chimie.
 Institut des Sciences
 naturelles.
 Institut pédagogique.
 Cours spéciaux de français
 pour les étrangers (Cours
 annuels à Lille.— Cours de
 vacances à Boulogne-sur-
 Mer).
UNIVERSITÉ DE LYON.
 Faculté de Droit.
 Faculté mixte de Médecine
 et de Pharmacie.
 Faculté des Sciences.
 Faculté des Lettres.
 École française de Droit de
 Beyrouth (Syrie).
 École française d'Ingénieurs
 de Beyrouth (Syrie).
 Institut des Sciences
 économiques et politiques.
 Institut bactériologique.
 Institut d'Hygiène.
 École de Chimie industrielle.
 École de Tannerie.
 Institut agronomique.
 Cours spéciaux de français
 pour les étrangers (Cours
 annuels et Cours de
 vacances).
 Collège oriental.
UNIVERSITÉ DE MONTPELLIER.
 Faculté de Droit.
 Faculté de Médecine.
 Faculté des Sciences.
 Faculté des Lettres.

INSTITUTIONS, DEGREE

École supérieure de Pharmacie.	École p Méd
Institut de Botanique.	Institu
Institut de Chimie.	Cours
Cours spéciaux de français pour les étrangers (Cours annuels).	pour annu Tour
UNIVERSITÉ DE NANCY	à To
Faculté de Droit.	UNIVERSI
Faculté de Médecine.	Faculté
Faculté des Sciences.	Faculté
Faculté des Lettres.	Faculté
École supérieure de Pharmacie.	École d Méd
Institut électrotechnique et de Mécanique appliquée.	Cours pour
Institut chimique.	annu
Institut de Géologie.	de va
École de Brasserie et de Malterie.	UNIVERSI
Institut agricole.	Faculté
Institut commercial.	Faculté et de
Institut colonial.	Faculté
Institut dentaire.	Faculté
École de Laiterie.	Institut
Cours spéciaux de français pour les étrangers (Cours annuels et Cours de vacances).	Institut Institut Union et es
UNIVERSITÉ DE POITIERS.	franç
Faculté de Droit.	(Esp
Faculté des Sciences.	Institut
Faculté des Lettres.	École p

Methods of Instruction. In all the Faculties, instruction is given, in the first place, by means of "official purpose of which is to set forth, in treatises, the aspects of the problems, the actual state and the lines of human knowledge. Courses with a liberal character") may be offered, on proper authorization, do not belong to the regular teaching staff of

A more technical and intensive instruction is given in the "cours réservés," open only to regularly matriculated and enrolled students. These courses are supplemented by discussion periods, seminars, and laboratory work. These latter are the most important factors in developing the student and training him in scholarly methods.

Finally, the Universities place at the disposition of the students libraries, museums, and special collections.

Academic Year. Vacations and Holidays. The academic year begins the first of November and extends to the end of July. However, because of the examinations, which occupy nearly the entire month of July, the courses come to an end in June. Consequently, no instruction is offered during the months of July, August, September and October, except in the special courses organized in some of the Universities in French literature, philology, language, etc., for the convenience of foreigners.

Aside from the summer vacation, all courses are discontinued on legal holidays, during the Christmas holidays (from December 24 to January 2) and during the Easter holidays (fifteen days).

Administration. Each University is administered by a "Conseil," composed of representatives of each Faculty or School and of the "Recteur de l'Académie," who is, *de jure*, president of the Council of the University. In the University of Paris, however, the administrative head has the title of "Vice-Recteur," the Minister of Public Instruction being "Recteur" *ex officio*.

Each Faculty or School is administered by a Dean or by a Director, elected by his colleagues, and appointed for three years by the Minister of Public Instruction.

Each Faculty or School possesses a Secretary's office, to which the student should apply in fulfilling all the formalities relative to admission, required courses, examinations, etc.

II. OTHER INSTITUTIONS OF HIGHER EDUCATION.

The institutions of higher learning independent of the Universities naturally divide into two great classes: (1) Official institutions under the direct administration of the State; (2) Independent institutions due to private initiative and funds.

Their organization is as different as their aims. Some are devoted primarily to research and to the presentation of the results



PARIS. THE MEDICAL SCHOOL.



PARIS. THE MEDICAL SCHOOL. AN

INSTITUTIONS, DEGRE

of research; others aim at giving technic particular branch of learning. Each institution of studies, its special conditions of admission

No attempt will be made here to treat institutions; they number more than a hundred.

Appendix it will be sufficient to call attention to differences in the conditions of admission, to present institutions, and then to single out a few ones which may be of special interest to Americans. For complete information with reference to any institution a student is recommended to consult either the Office National des Universités or the "Annuaire" issued by the various Universities, which contains a description of all the institutions of higher education in each administrative educational district ("Académie"). A University is the center.

Foreign students can usually gain admission to every one of these higher institutions, if not directly through their diplomas and certificates, then through their Ambassador or Minister before the proper authorities. Even though they may not be admitted to the institution for the diploma, conferred by the school, they can enter in the capacity of visitors. In case a student has completed a course of work of some special school, he should not enter till he has received a refusal through the proper authorities.

Admission to some of these establishments in France, the Muséum d'histoire naturelle, etc., is without scholastic requirement. Admission to the École polytechnique, École des mines, École nationale des ponts et chaussées, etc., is only on the basis of competitive examination.

The following list of institutions of higher education includes the various Instituts and Écoles attached to the different Universities, is reproduced from the Office National des Universités et Écoles. The institutions are grouped under the heading to which they are primarily devoted.

Établissements scientifiques et de lettres
*Collège de France, à PARIS, place Marcellin
Muséum d'Histoire naturelle, à PARIS, 57, rue de la Harpe
École pratique des Hautes Études, à PARIS, rue de la Harpe*

École Nationale des Chartes, à PARIS, à la Sorbonne.

École spéciale des Langues orientales vivantes, à PARIS, 2, rue de Lille.

École du Louvre, à PARIS, au Palais du Louvre.

Institut Pasteur, à PARIS, 26, rue Dutot.

Institut Pasteur de LILLE.

Institut Océanographique, à PARIS, 195, rue Saint-Jacques.

Enseignement des Sciences juridiques, économiques, politiques et sociales

École libre des Sciences politiques, à PARIS, 27, rue Saint-Guillaume.

Institut des Sciences économiques et politiques de l'Université de LYON.

École des Hautes Études sociales, à PARIS, 16, rue de la Sorbonne.

Collège libre des Sciences sociales, à PARIS, 28, rue Serpente.

Faculté libre de Droit de l'Institut catholique de PARIS, 74, rue de Vaugirard.

Facultés libres de Droit, à ANGERS, LILLE, LYON et MARSEILLE.

École libre de Droit de NANTES.

École de Législation professionnelle, à PARIS, 16, rue de l'Abbaye.

Instituts pratiques de Droit des Universités de BORDEAUX, DIJON, LILLE, POITIERS et TOULOUSE.

École de Notariat, à PARIS, 127, rue Notre-Dame-des-Champs.

Écoles de Notariat, à ANGERS, BORDEAUX, DIJON, LIMOGES, LYON, NANTES, POITIERS, RENNES, ROUEN et TOULOUSE.

Enseignement de la Médecine et des Sciences annexes

École de plein exercice de Médecine et de Pharmacie de NANTES.

Écoles préparatoires de Médecine et de Pharmacie, à AMIENS, ANGERS, LIMOGES, RENNES, ROUEN et TOURS.

Faculté libre de Médecine et de Pharmacie, à LILLE.

Institut de Médecine légale et de Psychiatrie de l'Université de PARIS.

Institut de Médecine coloniale de l'Université de PARIS.

Institut d'Hygiène de l'Université de LYON.

Institut d'Hygiène de l'Université de TOULOUSE.

Institut Pasteur, à PARIS, 26, rue Dutot.

Institut Pasteur de LILLE.

École d'Anthropologie, à PARIS, 15, rue de l'École-de-Médecine.

Institut général psychologique, à PARIS, 14, rue de Condé.

INSTITUTIONS, DEGRÉ

Institut psycho-physiologique, à PARIS, des-Arts.

École française d'Odontologie, à PARIS, 206,

École française de Stomatologie, à PARIS, 2.

Institut dentaire de l'Université de NANCY.

École Odontotechnique, à PARIS, 5, rue Garai

École dentaire de Paris, 45, rue de la Tour-d

École dentaire française, à PARIS, 29, boulevard

Écoles dentaires, à BORDEAUX et à LYON.

Enseignement des Let

Faculté libre des Lettres de l'Institut catholique Vaugirard.

Facultés libres des Lettres, à ANGERS, LILLE,

Enseignement des Scie

École libre des Hautes Études scientifiques Vaugirard.

Facultés libres des Sciences, à ANGERS, LILL

Enseignement de la Thé

Faculté libre de Théologie de l'Institut catholique Vaugirard.

Facultés libres de Théologie catholique d'AN TOULOUSE.

Faculté libre de Droit canonique de l' PARIS.

Faculté libre de Théologie protestante de Arago.

Faculté libre de Théologie protestante de Mo

Enseignement du Français pour

Cours spéciaux annuels des Universités de

CAEN, DIJON, GRENOBLE, LILLE,

NANCY, POITIERS, RENNES et TOULOUSE

françaises de Touraine, à TOURS, et de

à PARIS, 6, rue de la Sorbonne.

Cours de vacances des Universités de BESAN

GRENOBLE, LILLE (à Boulogne-sur Mer),

(à Saint-Malo), TOULOUSE, et de l'Ins

de Touraine, à TOURS.

Cours de vacances de l'Alliance française, à PARIS, 186, boulevard Saint-Germain, et de la Guilde internationale.

Écoles préparatoires à l'enseignement

École Normale supérieure, à PARIS, 45, rue d'Ulm.

École Normale supérieure d'Enseignement secondaire des jeunes filles, à SÈVRES (Seine-et-Oise).

École Normale supérieure de l'Enseignement technique, à PARIS, 151, boulevard de l'Hôpital.

École Normale supérieure d'Instituteurs, à SAINT-CLOUD (Seine-et-Oise).

École Normale supérieure d'Institutrices, à FONTENAY-AUX-ROSES.

Écoles Normales primaires d'Instituteurs et d'Institutrices.

Écoles Militaires

École Supérieure de Guerre, à PARIS, 33, avenue de la Motte-Picquet.

École Polytechnique, à PARIS, 21, rue Descartes.

École spéciale militaire, à SAINT-CYR (Seine-et-Oise).

École du Service de Santé militaire, à LYON.

École du Service de Santé militaire, à PARIS, au Val-de-Grâce, 277, rue Saint-Jacques.

École du Service des Poudres et Salpêtres, à PARIS, 12, boulevard Henri-IV.

Écoles de la Marine

École Supérieure de la Marine, à PARIS, 13, rue de l'Université.

École d'Application du Génie maritime, à PARIS, 140, boulevard du Montparnasse.

École Navale, à BREST.

École du Service de santé de la Marine, à BORDEAUX.

École annexe de Médecine navale, à BREST.

École du Commissariat de la Marine, à BREST.

Écoles des Mécaniciens des équipages de la flotte, à BREST.

Écoles d'Hydrographie, à ALGER, BORDEAUX, BOULOGNE, MARSEILLE, NANTES, BREST, BASTIA, DUNKERQUE, LORIENT, TOULON, LE HAVRE, SAINT-BRIEUC, AGDE, GRANVILLE, PAIMPOL, SAINT-MALO et SAINT-TROPEZ.

Écoles d'Enseignement professionnel et technique des pêches maritimes, à BOULOGNE-SUR-MER, DIEPPE, CALAIS, ARCACHON, CONCARNEAU, LE CROISIC, FÉCAMP, CROIX, LES SABLES-D'OLONNE, SAINT-VAAST-LA-HOUGUE.



PARIS. THE MEDICAL SCHOOL.



PARIS. THE MEDICAL SCHOOL.

INSTITUTIONS, DEGREES

Enseignement agricole

Institut National agronomique, à PARIS, 16,
École Nationale des Eaux et Forêts, à NANCY
Écoles Nationales d'Agriculture, à GRENOBLE,
MONTPELLIER et RENNES.

Institut agronomique de l'Université de LYON

Institut agricole de l'Université de NANCY.

Institut agricole de l'Université de TOULOUSE

Institut agricole de BEAUVAIS (Oise).

École Nationale supérieure d'Agriculture coloniale,
MARNE.

École Supérieure d'Agriculture d'ANGERS.

École Nationale d'Horticulture de VERSAILLES

École Nationale d'horticulture et de Vannoy,
(Haute-Marne).

École Nationale des Industries agricoles de DOLE

Écoles Nationales de l'Industrie laitière, à MONTBELLARD
à POLIGNY (Jura).

École de Laiterie de l'Université de NANCY.

École de Brasserie et de Malterie de l'Université de NANCY

Institut œnologique de l'Université de DIJON

Écoles Nationales vétérinaires, à ALFORT (Seine-et-Marne),
LOUSE.

École des Haras, au PIN-AU-HARAS (Orne).

Enseignements concernant les colonies

École Coloniale, à PARIS, 2, avenue de l'Observatoire

Institut Colonial de l'Université de BORDEAUX

Institut Colonial de l'Université de NANCY.

Institut de Médecine coloniale de l'Université de NANCY

Cours de Médecine coloniale de l'École de Médecine de NANCY

École Nationale supérieure d'Agriculture coloniale,
MARNE.

Écoles Coloniales d'Agriculture de TUNIS
(Algérie).

Enseignement technique industriel

Conservatoire National des Arts et Métiers, à PARIS,
Martin.

École Centrale des Arts et Manufactures, à PARIS

École Centrale lyonnaise, à LYON.

Institut industriel du nord de la France, à LILLE.

École spéciale des Travaux publics, du Bâtiment et de l'Industrie, à PARIS, 3, rue Thénard.

École d'Ingénieurs, à MARSEILLE.

Écoles Nationales des Arts et Métiers de PARIS (151, boulevard de l'Hôpital), AIX, ANGERS, CHALONS-SUR-MARNE, CLUNY (Saône-et-Loire) et LILLE.

Écoles nationales professionnelles, à ARMENTIÈRES (Nord), NANTES, VIERZON (Cher), VOIRON (Isère).

École de la Martinière, à Lyon.

École Nationale des Ponts et Chaussées, à Paris, 28, rue des Saints-Pères.

École Nationale supérieure des Mines, à PARIS, 60, boulevard Saint-Michel.

École Nationale des Mines de SAINT-ÉTIENNE.

Institut de Géologie de l'Université de NANCY.

Institut d'Hydrologie de l'Université de TOULOUSE.

Écoles des Maîtres mineurs d'ALAIS et DOUAI.

Institut Électrotechnique de l'Université de GRENOBLE.

Institut Électrotechnique de l'Université de LILLE.

Institut Électrotechnique et de Mécanique appliquée de l'Université de NANCY.

Institut Électrotechnique de l'Université de TOULOUSE.

École Supérieure d'Électricité, à PARIS, 12, rue de Staël.

École d'Électricité et de Mécanique industrielle, à PARIS, 50, rue Violet.

École d'Électricité industrielle, à MARSEILLE.

École pratique d'Électricité industrielle, à PARIS, 53, rue Bel-liard.

École spéciale de Mécanique et d'Électricité, à PARIS, 20 bis, rue Bertrand.

École Bréguet, à PARIS, 81-83, rue Falguière.

Institut de Chimie appliquée de l'Université de PARIS.

Institut chimique de l'Université de NANCY.

Institut de Chimie de l'Université de TOULOUSE.

Institut de Chimie de l'Université de MONTPELLIER.

Institut et École de Chimie de l'Université de LILLE.

École de Chimie appliquée à l'industrie et à l'agriculture de l'Université de BORDEAUX.

École de Chimie industrielle de l'Université de LYON.

INSTITUTIONS, DEGREE

École municipale de Physique et de Chimie
10, rue Vauquelin.

Institut de Chimie industrielle de CLERMONT

École de Chimie industrielle de ROUEN.

Institut Aérotechnique de l'Université de
L'ÉCOLE (Seine-et-Oise).

École Supérieure d'Aéronautique et de Con-
PARIS, 92, rue de Clignancourt.

École Supérieure professionnelle des Postes et
103, rue de Grenelle.

Écoles Nationales d'Horlogerie de BESANÇON
Savoie).

École de Papeterie de l'Université de GRENOBLE

École de Tannerie de l'Université de LYON.

École de Brasserie et de Malterie de l'Université

Enseignement technique co-

École des Hautes Études commerciales, à PARIS
ville.

Institut des Sciences commerciales de l'Université

Institut Commercial de l'Université de NANCY

Institut Commercial de PARIS, 15, avenue de

École Supérieure pratique de Commerce et
79, avenue de la République.

École Supérieure pratique de Commerce et d'

Écoles Supérieures de Commerce d'ALGER

LE HAVRE, LYON, MARSEILLE, MONTPELLIER
ROUEN et TOULOUSE.

Enseignement des Beaux

École Nationale et spéciale des Beaux-Arts, à PARIS,
partie.

École du Louvre, à PARIS, au Palais du Louvre

Écoles Nationales des Beaux-Arts, à ALGER,
LYON, TOULOUSE.

Écoles régionales des Beaux-Arts, à AMIENS,

MONTPELLIER, NANCY, RENNES, ROUEN,
TOURS.

Écoles Municipales des Beaux-Arts, à ANGERS,

DEAUX, CAEN, GRENOBLE, LE HAVRE,

École spéciale d'Architecture, à PARIS, 254, boulevard

Écoles régionales d'Architecture, à LILLE, LYON, MARSEILLE, RENNES et ROUEN.

École de Sculpture, à GRENOBLE.

École Nationale des Arts décoratifs, à PARIS, 5, rue de l'École-de-Médecine et 10, rue de Seine.

Écoles Nationales des Arts décoratifs, à AUBUSSON, LIMOGES et NICE.

École Nationale des Beaux-Arts et des Arts décoratifs de BORDEAUX.

École Nationale des Arts appliqués à l'Industrie de BOURGES.

École Nationale des Arts appliqués à l'Industrie, à ROUBAIX (Nord).

École départementale d'Art appliqué de BORDEAUX.

École des Beaux-Arts et des Sciences industrielles de TOULOUSE.

Écoles régionales des Arts industriels, à REIMS et à SAINT-ÉTIENNE.

Conservatoire National de Musique et de Déclamation, à PARIS, 14, rue de Madrid.

Conservatoires Nationaux et Écoles Nationales de Musique, à CHAM-BÉRY, DIJON, LILLE, LYON, MONTPELLIER, NANCY, NANTES, NÎMES, PERPIGNAN, RENNES, TOULOUSE, AMIENS, CAEN, DOUAI, TOURS, etc.

Schola Cantorum, à PARIS, 269, rue Saint-Jacques.

Among the schools enumerated above are several, mostly located in Paris, to which special attention should be called, either since they offer lines of work which are not presented by the Universities or since their work extends and supplements the work of the Universities.

Collège de France. Founded in 1530 by Francis I, in opposition to the then mediaevalism of the Sorbonne, the Collège de France has been throughout its history one of the most famous and active seats of liberal investigation in the world. Its central aim is to contribute to the progress of science by discoveries, research, and instruction and finally by special undertakings and publications. As at present constituted, it comprises forty-five chairs of research, representing nearly all the main lines of investigation. In general function it corresponds very closely to our Carnegie Institution.

The courses of lectures are open to the general public without any charge. On the contrary, admission to the laboratories is granted only to persons authorized by the professors in charge and who evidence sufficient preparation. The Collège de France confers no degree and grants no diploma. However, each professor



PARIS. THE PHARMACY SCHOOL



PARIS. THE PHARMACY SCHOOL
BOTANIC GARDEN AND LABORATORY

INSTITUTIONS, DEGREE

may deliver either "Certificats d'assiduité et de recherches" or "d'études," which are given by the Director.

Muséum d'Histoire Naturelle, at 57 rue de Buffon, Paris, has as its object to provide public instruction in natural history; but through its instruction and the experiments carried on in its laboratories, it is also a center of science, of free and disinterested research. It has several chairs, devoted to the different branches of natural history.

The courses of the *Muséum* are open to all, and are free of charge. In order to follow the lectures, it is necessary to enroll at the various laboratories, if required, and foreigners are admitted on the same terms as Frenchmen. The *Muséum*, like the Collège de France, gives no degree and delivers no diploma. However, a "Certificat d'assiduité" may be given at the end of the courses by the professors whose courses they have followed.

École Pratique des Hautes Études, at 17 rue de la Sorbonne, Paris, is intended to furnish, alongside of the instruction of the Faculties, advanced practical instruction, to strengthen and extend it.

The school is divided into five sections: (1) Philological sciences; (2) Mathematical and physical sciences; (3) Chemical sciences; (4) Biological sciences; (5) Historical and philosophical sciences. But only the sections of Historical and Philosophical sciences and that of Religious sciences are centralized. The sections of Natural sciences, at Sorbonne, have a real and autonomous existence. They are constituted by courses and laboratories, and are given at the Collège de France, and at the Faculties of Sciences, and even of the provinces.

The courses are open to the public free of charge. No payment as to age, nationality, or degree is demanded. But in order to be admitted to a laboratory, or to a special course, the permission of the Director is required.

The normal course of study is three years. The first year, which is a sort of probation year, is for students who have done satisfactory work received from the *titulaires de l'école pratique des hautes études*. After the first year, they may, by presenting a memoir, be admitted to the second year, and so on. They are called "Elèves diplômés."

Institut Pasteur, at 26, rue Dutot, Paris. The Institut Pasteur is at the same time a center of research, a school of higher instruction, and, in certain of its sections, a medical establishment. It is divided into three sections: Section of microbiology; Section of serotherapy; Section of biological chemistry.

In this latter section theoretical and practical instruction is offered, comprising courses and laboratory work during three months beginning in November. The fees for laboratory work, material, and instruction is 250 francs. A "Certificat de présence et d'études" may be granted to students who have followed regularly the courses and laboratory work.

École Libre des Sciences Politiques, at 27, rue Saint-Guillaume, Paris. This is one of the most famous schools in the world, in the field of the political, social, and economic sciences. Its courses of study comprise all the sciences necessary for the training of anyone who would make politics his profession or would enter upon an administrative career.

Organization. The courses and lectures are grouped under five sections: Administrative section; Economic and Financial section; Economic and Social section; Diplomatic section; General section (Public law and history). The course of study normally requires three years. A supplementary year, comprised of special courses, is open to graduate students of the school.

Conditions of admission. The School receives regularly enrolled pupils or auditors, whether foreigners or Frenchmen. No university degree nor any examination is required for admission.

Fees. Enrollment for the entire normal course of study: 350 francs a year. Partial enrollment for a single course or for one lecture a week: 70 francs a year. Enrollment for the supplementary year: 250 francs.

Degree. In each section, a partial examination is held at the end of each year and a general examination at the end of the three years' course. A diploma is conferred on the candidates who successfully pass these examinations. Fees for the examinations and the diploma: 140 francs.

II. DEGREES, DIPLOMAS, AND CERTIFICATES IN THE UNIVERSITIES.

Scholastic work done in French Universities may be attested by *certificates* of assiduity, or by *degrees*, *diplomas*, and *certificates*.

There are two great and distinct groups of degrees, diplomas, and certificates: (1) those conferred *by the State*; (2) those conferred *by the Universities*.

(1) The degrees, diplomas, and certificates, conferred *by the State*, grant to those who possess them various prerogatives, particularly the right of practising in France certain professions.

(2) The degrees, diplomas, and certificates conferred *by the Universities* themselves, and in their own name, serve to attest studies pursued for which the State has created no formal approval; or again they put upon the same studies as those pursued for the corresponding degrees of the State a stamp of equal value, without conferring the right to practise in France the professions for which the possession of the latter is required. As, in general, the conditions of "inscription" for the degrees conferred by the Universities make it possible to take fuller account of the scholastic work already done in other countries, these degrees and diplomas are more easily accessible to foreign students.

I. CERTIFICATES OF ASSIDUITY ("CERTIFICATS D'ASSIDUITÉ").

These certificates are especially useful to foreign students who desire to receive credit in the universities of their native country for the time they have spent in a French University. They may be earned by any foreign student who has been regularly matriculated and who has taken part in the prescribed work of a Faculty or School during at least one semester.

As the formalities for keeping track of this prescribed work vary from University to University and from Faculty to Faculty, all students desiring, at the end of their studies, to obtain such a certificate are recommended to make this intention known when they matriculate at the office of the Secretary of their Faculty. They will then receive instructions relative to their various obligations.

A request for a Certificate of Assiduity must be addressed to the office of the Secretary of the Faculty at the end of the semester.

II. DEGREES, DIPLOMAS, AND CERTIFICATES CONFERRED BY THE STATE.

These degrees, diplomas, and certificates are those required by the State for the practice in France of various professions.

They will be found enumerated in the following description, grouped under the Faculties which confer them, together with an indication of the work prescribed and fees required.

A. Degrees and Diplomas in Law

The degrees and diplomas of the State, earned under the Faculties of Law, are the "Certificat de capacité en droit," the "Licence en droit," and the "Doctorat en droit."

Certificat de Capacité en Droit. Open to both French and foreign students without any requirement as to degrees or diplomas. Prescribed work: Two years of study, evidenced by eight "inscriptions;" examinations at the end of each of the two years. Expenses involved: "Inscriptions," 260 francs; fees for examinations and certificate, 130 francs.

Licence en Droit. Open to French students who produce the "baccalauréat" or an exemption from the "baccalauréat," and to foreign students who can produce the "baccalauréat" or who have obtained an equivalence of the "baccalauréat." Prescribed course: Three years of study, involving twelve "inscriptions;" examinations at the end of each of the three years of study. Success in passing the examinations which close the *second* year confers the degree of "bachelier en droit." Expenses involved: "Inscriptions," 390 francs; fees for examinations and diplomas, 750 francs.

Doctorat en Droit. The "doctorat en droit" is general, as far as the degree is concerned, but the diploma bears an indication of one of the two lines of specialization: "sciences juridiques" or "sciences politiques et économiques." Conditions of admission: Candidates must be "licenciés en droit." Foreigners who have not obtained the "licence en droit," but who have already graduated from a foreign university, may become candidates for the "doctorat" on the condition that they obtain an equivalence of the "licence." Prescribed work: One year of study, involving four "inscriptions;" examinations: two oral examinations and the defense of a thesis. Expenses involved: "Inscriptions," 130 francs; fees for examinations, thesis and diploma, 445 francs.

B. Degrees and Diplomas in Medicine

The degrees and diplomas of the State, earned under the Faculties of Medicine, the "Facultés mixtes," and the "Écoles de plein exercice de Médecine et de Pharmacie," are the "Doctorat en médecine," the "Diplôme de chirurgien-dentiste," and the "Diplômes de sagefemme" (1st and 2nd class).

Doctorat en Médecine. The diploma of the State of "docteur en médecine" is the degree which confers the right to practice medicine throughout the entire extent of French territory. Conditions of admission: Candidates must present the "baccalauréat français" and the "certificat d'études physiques, chimiques et naturelles" ("P. C. N."), granted by a Faculty of Science. No exemption or equivalence is admitted. Prescribed course: Five years of required studies, involving twenty "inscriptions." Clinical work is obligatory during the entire term of study. During the first four years it must be pursued at the seat of the faculty or School itself; during the fifth year, it may, with the consent of the Faculty, be pursued in institutions at the choice of the student either in France or abroad. Internes and externes attached to hospitals, who are appointed on the basis of competitive examinations may count their service as equivalent to the clinical work in medicine and surgery. Examinations at the end of each of the five years of study. Three clinical examinations. Defense of a thesis. Expenses involved: "Inscriptions" and laboratory fees, 950 francs; fees for examinations, thesis and diploma, 690 francs.

Diplôme de Chirurgien-Dentiste. This diploma is required of everyone who wishes to practice dentistry in France. Conditions of admission: Candidates must be at least 16 years old and must present either the "baccalauréat," or the "brevet supérieur de l'enseignement primaire," or the "certificats d'études primaires supérieures," or the "diplôme de fin d'études de l'enseignement secondaire des jeunes filles." No equivalence or exemption is permitted. Prescribed course: Five years, comprising three years of studies and two years of clinical work, involving twelve "inscriptions." The clinical and scholastic work is done, either in the Faculties or Schools of Medicine in which dental instruction is organized, or in the independent institutions of higher dental instruction; e. g., the "École dentaire," the "École odontotechnique," and the "École dentaire française" in Paris. A partial exemption from the prescribed course may be granted to foreign dentists if they have already obtained one of the French diplomas

indicated above. Examinations: (1) A test of clinical knowledge and ability; (2) three examinations, one at the end of each year of scholastic work. Medical students who present twelve "inscriptions" are admitted to the examinations for the "diplôme de chirurgien-dentiste," with complete exemption from the first of these examinations if they complete successfully the two years of clinical work. Expenses involved: The fees in the various independent schools of dentistry vary from 1000 to 2500 francs for the three-year course; fees for examinations and diploma, 250 francs.

Diplôme de Sage-Femme. These diplomas must be produced by all women who would practice the art of midwifery in French territory.

C. Degrees and Diplomas in the Sciences.

The degrees and diplomas of the State, earned under the Faculties of Sciences, are the "Certificat d'études physiques, chimiques et naturelles" (P. C. N.), the "Certificats d'études supérieures de sciences," the "Licence," the "Diplômes d'études supérieures de sciences," and the "Doctorat ès sciences."

Certificat d'Études Physiques, Chimiques et Naturelles ("P. C. N."). Open to French students who present the "baccalauréat," or the "brevet supérieur," or the "certificat d'études primaires supérieures," or the "diplôme de fin d'études de l'enseignement secondaire des jeunes filles." Foreign students who have not obtained the "baccalauréat" may work for this certificate by obtaining an equivalence therefor. However, all students, foreigners as well as Frenchmen, who desire, by presenting this certificate, to become candidates for the degree of "docteur en médecine" conferred by the State, must absolutely be provided with the "baccalauréat français." Prescribed course: A year of study involving four "inscriptions;" examinations at the end of the year. Expenses involved: Inscriptions and laboratory fees, 220 francs; examination, 85 francs.

Certificats d'Études Supérieures de Sciences. The number and nature of these certificates vary according to the Universities. In the sections devoted to the various Faculties of Sciences in the hand-book published by the Office National des Universités et Ecoles Françaises or in the "Livrets de l'Étudiant" published by each University, will be found a complete list of the certificates conferred by each Faculty. Conditions of admission: These



PARIS. THE SCHOOL OF SCIENCES.
ONE OF THE BOTANICAL LABORATORIES



PARIS. THE SCHOOL OF SCIENCES.
LABORATORY OF BIOLOGICAL CHEMISTRY

certificates are open to French students who present the "baccalauréat" or an exemption therefrom, and to foreign students who have already obtained the "baccalauréat" or an equivalence for the "baccalauréat." Prescribed course: One year of study involving four "inscriptions"; examinations comprise a written test, a test as to laboratory ability, and an oral test. Expenses involved: "Inscriptions," 130 francs; the laboratory fees vary from 40 to 100 francs according to the nature of the studies; examination fee, 35 francs for the first certificate, and 30 francs for each succeeding certificate.

Licence ès Sciences. The "diplôme de licencié ès sciences" is conferred, on the payment of a diploma fee of 40 francs, to any student who has obtained three of the "certificats d'études supérieures," chosen by him from the list of those which the Faculty is authorized to grant.

Diplômes d'Études supérieures de Sciences. These diplomas are three in number and bear an indication of one of the following lines of specialization: Mathematics, Physical sciences, Natural sciences. Conditions of admission: No condition whatever as to age, "inscription," degree, or nationality is required. Examinations: (1) Composition of a monograph bearing on a subject approved by the Faculty; (2) an oral examination on this work and allied subject-matter.

Doctorat ès Sciences. The "doctorat ès sciences" is general, so far as the degree is concerned, but the diploma may bear an indication of one of the following lines of specialization: Mathematics, Physical sciences, Natural sciences. Conditions of admission: Candidates must be "licenciés ès sciences" ("Licence d'enseignement") or, if they are foreigners, have obtained an equivalence of the "licence." Examinations: Two theses or a thesis and a discussion of problems formulated by the Faculty. Fees for the examination and diploma: 145 francs.

D. Degrees and Diplomas in Letters.

The degrees and diplomas of the State, earned under the Faculties of Letters, are the "Licence ès lettres," the "Diplômes d'études supérieures," and the "Doctorat ès lettres."

The "diplôme de licencié ès lettres" bears an indication of one of the following lines of specialization: Philosophy, History and Geography, Classical Languages and Literatures, Modern Languages and Literatures. Conditions of admission: French candi-

dates must present the "baccalauréat" or an exemption therefrom, and foreign candidates, if they have not the "baccalauréat français," must have obtained an equivalence therefor. Prescribed course: A year of study involving four "inscriptions;" the examinations comprise both written and oral tests. Expenses involved: "Inscriptions," 130 francs; examination fee, 105 francs.

Diplôme d'Études Supérieures de Lettres. These diplomas are four in number, corresponding to the four following lines of specialization: Philosophy, History and Geography, Classical Languages and Literatures, Modern Languages and Literatures. Conditions of admission: No requirement as to age, "inscription," degree, or nationality is demanded. Examinations: (1) Composition of a monograph on a subject approved by the Faculty; (2) oral examination on this composition and allied subject matter.

Doctorat ès Lettres. The candidates must be "licenciés ès lettres" or, if they are foreigners, have obtained an equivalence of the "licence" (cf. *infra*). Examinations: Two theses must be presented and defended. The first must be written in French. The second, which may be a memoir or a critical study, must be written either in French or in one of the ancient or modern languages taught at the Faculty. It should be, as far as possible, a work of erudition: critical bibliography or catalogue, critical edition of an important text not already published or badly published, critical examination of or commentary on a document, etc. The subject and plan of both the theses must be approved by the Faculty. The fees for the theses and the diploma amount to 140 francs.

E. Degrees and Diplomas in Pharmaceutical Studies

The degrees and diplomas conferred by the State for pharmaceutical studies are the "Diplôme de pharmacien," "Diplôme supérieur de pharmacien," and "Certificats d'aptitude à la profession d'herboriste."

The "diplôme de pharmacien" is required of every one acting as a pharmacist in France. The "baccalauréat français" is absolutely required of all candidates, French or foreign, for either of the first two degrees mentioned above.

Since the number of American students interested in this line of work is apt to be much smaller than in the lines previously mentioned, it will be sufficient to refer to the handbook of the

Office National des Universités or the "Livrets de l'Étudiant" of the various Universities for the conditions of admission, courses prescribed, examinations and fees incident to each of these degrees.

III. DEGREES, DIPLOMAS, AND CERTIFICATES CONFERRED BY THE UNIVERSITIES.

As has already been said above, the Universities have created degrees and diplomas, either for stamping with formal approval and value courses of study to which no degree or diploma of the State corresponds, or for rendering it possible for foreign students, by receiving credit for their previous foreign studies, to obtain diplomas which have the same scientific value as the corresponding diplomas conferred by the State, but which do not grant the same right to practise in France certain professions.

Since these degrees and diplomas are created by the Universities themselves, the work prescribed and the fees required vary from one University to another, even though the names by which they are designated are the same. Furthermore, since the degrees number nearly a hundred, each with its own requirements, it has seemed wise to present merely a list of these degrees and diplomas to indicate their variety and scope; and then to single out for special consideration a few in which American students would more likely be interested.

In the following list, which is reproduced from the Handbook of the Office National des Universités et Écoles Françaises (pp. 48-52), each degree and diploma is arranged under the head of the Faculty which confers it. For a complete statement of the requirements for obtaining these various degrees, consult the Handbook or the "Livrets de l'étudiant" issued by the various Universities.

A. Degrees and Diplomas for Studies in Law, Politics, Economics, and Commerce

Doctorat en droit: Universités de PARIS, DIJON, GRENOBLE, LILLE, LYON, et NANCY.

Doctorat ès lois: Université de CAEN.

Licence en droit: Universités de DIJON et de NANCY.

Certificat supérieur de capacité en droit: Université de GRENOBLE.

Certificat d'études juridiques: Université de NANCY.

Certificat d'études pratiques de droit: Universités de BORDEAUX, CAEN, DIJON, LILLE, POITIERS.

Certificat d'études notariales: Université de LYON.

Certificat d'études des sciences juridiques, politiques ou économiques: Université de DIJON.

Diplôme de l'Institut lyonnais des sciences économiques et politiques: University de LYON.

Certificat de sciences pénales: Université de PARIS.

Certificat d'études pénales: Université de MONTPELLIER.

Certificat d'études administratives et financières: Universités de PARIS et de TOULOUSE.

Certificat d'études administratives algériennes: Université d'ALGER.

Certificat supérieur d'études administratives algériennes: Université d'ALGER.

Diplômes d'études coloniales: Université de NANCY.

Diplôme de l'Institut d'enseignement commercial de l'Université de GRENOBLE.

Certificat d'études de l'Institut d'enseignement commercial de l'Université de GRENOBLE.

Diplôme d'ingénieur commercial: Université de NANCY.

Diplôme d'études supérieures commerciales: Université de NANCY.

Certificat d'études supérieures commerciales: Université de NANCY.

B. Degrees and Diplomas for Studies in Medicine and Allied Subjects

Doctorat en médecine: Universités de PARIS, ALGER, BORDEAUX, LILLE, LYON, MONTPELLIER, NANCY, TOULOUSE.

Diplôme de médecin colonial: Universités de PARIS et de BORDEAUX.

Diplôme d'études médicales coloniales: Université d'AIX-MARSEILLE.

Diplôme de médecine légale et psychiatrie: Université de PARIS.

Diplôme d'études de médecine légale et de psychiatrie médico-légale: Université de LILLE.

Diplôme d'études psycho-physiologiques: Université de LYON.

Diplôme de docteur ès sciences biologiques: Université de NANCY.

Certificat d'études spéciales d'hygiène: Université de LILLE.

Certificat d'études d'hygiène: Universités de LYON et de TOULOUSE.

Certificat d'études hydrologiques: Université de TOULOUSE.

Diplôme de chirurgien-dentiste pour les étudiants étrangers: Universités de BORDEAUX, LILLE et NANCY.

C. Degrees and Diplomas for Studies in the Sciences
(Pure and Applied Sciences, Mathematics, Physics,
Chemistry, Biology, Electrotechnic, etc.)

Doctorat ès sciences: Universités de PARIS, AIX-MARSEILLE,
BESANÇON, BORDEAUX, CLERMONT, DIJON, GRENOBLE, LILLE,
LYON, MONTPELLIER, NANCY, TOULOUSE.

Diplôme de mathématiques générales: Université de LYON.

Diplôme de licencié mécanicien: Université de LILLE.

Diplôme d'ingénieur mécanicien: Université de NANCY.

Diplôme de licencié physicien: Université de LILLE.

Brevet d'électricité industrielle: Universités d'AIX-MARSEILLE et de
CLERMONT.

Certificat d'études d'électricité industrielle: Université d'ALGER.

Diplôme d'électricité appliquée: Université de BESANÇON.

Brevet ou certificat d'études électrotechniques: Universités de GRE-
NOBLE, LILLE, LYON, MONTPELLIER.

Diplôme d'ingénieur électricien: Universités de GRENOBLE, NANCY,
TOULOUSE.

Brevet d'électricien: Université de POITIERS.

Brevet de conducteur électricien: Université de GRENOBLE.

Diplôme d'ingénieur chimiste: Universités de PARIS, BORDEAUX,
LILLE, LYON, MONTPELLIER, NANCY, TOULOUSE.

Diplôme de chimiste: Universités d'AIX-MARSEILLE, ALGER,
CLERMONT, RENNES.

Brevet de chimie industrielle: Université de CLERMONT.

Brevet d'études techniques de chimie industrielle: Université de
LYON.

Brevet de chimie agricole: Université de CLERMONT.

Diplôme de chimiste agricole: Université de POITIERS.

Diplôme de sciences chimiques et naturelles appliquées à l'agriculture:
Université de RENNES.

Diplôme d'agriculture: Université de BESANÇON.

Diplôme d'études agronomiques supérieures: Université de LYON.

Diplôme d'études supérieures agronomiques: Université de NANCY.

Diplôme d'études d'agronomie: Université de CAEN.

Diplôme d'études agricoles: Université de TOULOUSE.

Diplôme d'études coloniales: Université de NANCY.

Diplôme de licencié géologue: Université de LILLE.

Diplôme d'ingénieur géologue: Université de NANCY.

Diplôme de géologue minéralogiste: Université d'ALGER.

Diplôme d'hydrobiologie et de pisciculture: Université de TOULOUSE.
Certificat d'études supérieures de sciences appliquées au génie civil:
 Université d'ALGER.

Diplôme d'études supérieures aérodynamiques: Université de NANCY.

Diplôme d'ingénieur horloger: Université de BESANÇON.

Brevet d'œnologie: Université de DIJON.

Diplôme supérieur d'études œnologiques: Université de DIJON.

Diplôme d'ingénieur papetier: Université de GRENOBLE.

Brevet de conducteur papetier: Université de GRENOBLE.

Diplôme d'études supérieures de brasserie: Université de NANCY.

Diplôme d'ingénieur brasseur: Université de NANCY.

Certificat d'études de l'École de laiterie: Université de NANCY.

Diplôme d'études psycho-physiologiques: Université de LYON.

Certificat de maturité du Collège oriental de l'Université de LYON.

Diplôme d'aptitude à l'enseignement (mention Sciences) du Collège oriental de l'Université de LYON.

Diplôme d'études scientifiques du Collège oriental de l'Université de LYON.

D. Degrees and Diplomas for Studies in the Humanities (Literatures, Linguistics, Philosophy, History, Geography, etc.)

Doctorat ès lettres: Universités de PARIS, AIX-MARSEILLE, BESANÇON, BORDEAUX, CAEN, CLERMONT, DIJON, GRENOBLE, LILLE, LYON, MONTPELLIER, NANCY, POITIERS, RENNES, TOULOUSE.

Diplôme d'études universitaires: Universités de PARIS et de BORDEAUX.

Certificat d'études littéraires: Université de POITIERS.

Certificat d'études françaises: Universités de PARIS, BESANÇON, BORDEAUX, CAEN, CLERMONT, GRENOBLE, LILLE, LYON, MONTPELLIER, NANCY, POITIERS, RENNES, TOULOUSE.

Diplôme de langue française: Université de DIJON.

Brevet de langue française: Université de DIJON.

Diplôme de hautes études de langue et de littérature françaises: Université de GRENOBLE.

Diplôme d'études supérieures de phonétique française: Universités de GRENOBLE et de LILLE.

Certificat de maturité du Collège oriental de l'Université de LYON.

Diplôme d'aptitude a l'enseignement (mention lettres) du Collège oriental de Université de LYON.

Diplôme d'études littéraires du Collège oriental de l'Université de LYON.

Certificat d'aptitude a l'enseignement du français a l'étranger:
Universités de GRENOBLE et de POITIERS.

Certificat supérieur pour l'enseignement du français a l'étranger:
Université de GRENOBLE.

Diplôme d'études pédagogiques supérieures: Université de LYON.

Diplôme d'études psycho-physiologiques: Université de LYON.

Diplôme d'études russes: Universités de DIJON et de LILLE.

Diplôme d'études chinoises: Université de LYON.

Diplôme d'études celtiques: Université de RENNES.

E. Degrees and Diplomas for Pharmaceutical Studies

Doctorat en pharmacie: Universités de PARIS, ALGER, BORDEAUX, LILLE, LYON, MONTPELLIER, NANCY, TOULOUSE.

Diplôme de pharmacien: Universités de PARIS, BORDEAUX, NANCY.

Diplôme d'études de pharmacien de 1^{re} classe: Université de LYON.

Diplôme supérieur d'études de pharmacien de 1^{re} classe: Université de LYON.

Diplôme d'études pharmaceutiques coloniales: Université d'AIX-MARSEILLE.

Two groups of degrees in this somewhat bewildering list will prove of special interest to a large number of American students: (1) the "doctorats de l'université" ("mention Droit, Médecine, Sciences, Lettres, Pharmacie"); (2) the "certificats d'études françaises," "diplome de langue française," and other degrees conferred on foreign students only, for their achievements in French language and literature.

(1) The "*doctorat de l'université*," which is conferred by the Universities themselves, is the degree most often sought by American graduate students in France. And for two good reasons: first, it is declared by the French educational authorities to have the same scientific and academic value as the "*doctorat de l'État*," and its status in this country is approximately that of the usual American doctor's degree; secondly, the latitude permitted to the Universities in establishing equivalences between college and university work completed in another country and the French requirements gives less difficulty in satisfying the technical conditions

for becoming a candidate for the degree. On this point consult more particularly what is stated below, under "Equivalences."

The "doctorat de l'université" bears an indication of one of the five lines of specialization, corresponding to the faculty in which the studies are pursued, as Law, Medicine, Sciences, Letters, or Pharmacy. Not all the Universities confer the degree in all these lines of specialization, even when the University comprises a corresponding Faculty. For example, of the sixteen French Universities, two have no Faculty of Law (Besançon and Clermont-Ferrand). Out of the remaining fourteen which possess such Faculties, only seven confer the "doctorat de l'université, mention Droit."

In the following brief description of the "doctorat de l'université" in the different branches in which it is conferred, the attempt has been simply to indicate the Universities in which the degree is granted, the general requirements, and the range of fees.

Doctorat de l'Université, mention Droit. Conferred by the Universities of Paris, Caen, Dijon, Grenoble, Lille, Lyon, and Nancy. Open to foreign students only who present the French diploma of "licence en droit," or who obtain from the Faculty, on the basis of diplomas or degrees earned abroad, an equivalence therefor. The term of study required is one year, except in the Universities of Caen and Lille where it is two years. The preparation and defence of a thesis, and oral (sometimes also written) examinations on problems or subject matter indicated in advance by the Faculty. The total fees for matriculation or "inscriptions," examinations, thesis, and diploma vary from 161 to 380 francs, according to the University.

Doctorat de l'Université, mention Médecine. Conferred by the Universities of Paris, Alger, Bordeaux, Lille, Lyon, Montpellier, Nancy, Toulouse. Open to foreign students only who have obtained an equivalence of the "baccalauréat de l'enseignement secondaire." The prescribed course of study of five years, the examinations and the fees are the same as for the corresponding degree conferred by the State. Those who have already fulfilled abroad some of the requirements may be given credit for it in the French curriculum ("équivalence de scolarité").

Doctorat de l'Université, mention Sciences. Conferred by the Universities of Paris, Aix-Marseille, Besançon, Bordeaux, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy and Toulouse. Open to both French and foreign students who



PARIS. THE LAW SCHOOL. FAÇADE



PARIS. THE LAW SCHOOL. READING ROOM

present two or three "certificats d'études supérieures de sciences d'État," or other degrees and diplomas judged by the Faculty to be equivalent. The preparation and defence of a thesis and oral (sometimes written) examinations on problems or subject matter indicated in advance by the Faculty. The term of study required is one year, except at the University of Montpellier where it is two years. The fees for matriculation, examinations, thesis, and diploma vary from 80 to 180 francs. In addition to this, laboratory fees run from 200 to 800 francs, according to the line of work.

Doctorat de l'Université, mention Lettres. Conferred by the Universities of Paris, Aix-Marseille, Besançon, Bordeaux, Caen, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Poitiers, Rennes, Toulouse. Open to any French or foreign student who presents the "licence ès lettres," or other degrees or diplomas judged equivalent or otherwise sufficient by the Faculty. The required term of study is usually two years, one of which must be passed in residence at the University where the degree is sought, while the other may be spent in another French university, in some cases even in a foreign university. However, Bordeaux, Montpellier, Nancy, and Toulouse require only one year of study, while Rennes requires three. The preparation and defence of a thesis and an oral examination on problems or subject matter indicated in advance by the Faculty. The fees for matriculation, examination, thesis, and diploma vary from 100 to 200 francs.

Doctorat de l'Université, mention Pharmacie. Open to French students who present the "diplôme de pharmacien," and to foreign students who obtain by examination the "certificat d'études de pharmacie chimique et de toxicologie" and the "certificat de pharmacie galénique et de matière médicale," or who present degrees and diplomas recognized as equivalent. The term of study is one year. Preparation and defence of a thesis. The fees for matriculation, laboratory, examination, and thesis vary from 530 to 730 francs.

(2) "*Certificats d'études Françaises*," "*Diplôme d'études françaises*," etc. Open only to foreigners, without any requirement as to degrees or titles. The term of study is usually one semester at least. The fees are usually 30 francs for matriculation and from 20 to 50 francs for the examination. All the French Universities

(except Aix and Alger) offer courses leading to these certificates. At a number of Universities summer schools during July and August have been organized in connection with the elaborate courses in French language, literature, and phonetics established by the Alliance française. Work done in these summer courses is often accepted in at least partial fulfilment of the requirements for these certificates. For full information concerning these summer courses in the Universities and in the various schools under the direction of the Alliance française, consult the "Guide illustré de l'étudiant étranger à Paris et en France," published under the direction of the Alliance at the Librairie Larousse, and the "Bulletin officiel de la Fédération de l'Alliance française aux États-Unis et au Canada," 1420 Broadway, New York City.

III. ADMISSION TO THE UNIVERSITIES.

The student who seeks to enter any French University may be admitted: (1) simply as a matriculated student; (2) as a student enrolled (*inscrit*) as a candidate for a definite degree or diploma; (3) as a pupil (*élève*) in an Institute or School attached to a University.

Since the conditions of admission to the Institutes and Schools vary somewhat from one to another, the necessary indications pertaining thereto should be sought in the Handbook of the Office National des Universités et Écoles françaises, or in the "Livrets de l'Étudiant" issued by the Universities themselves.

Since, on the contrary, the regulations governing matriculation and enrollment (*inscription*) are common to all the Universities, these have been grouped together in the following description.

I. MATRICULATION.

The necessary, but adequate, condition for being admitted to follow the courses and discussions of a University, to use its libraries, collections, and instruments of work of every sort, is Matriculation, which implies being registered in due form on the books of a Faculty or School of the University.

Matriculation makes one a student and confers the right to follow the instruction, not only of the Faculty or School in which one is matriculated, but also of the various Faculties or Schools which make up the University.

It is the only formality required of students, and particularly foreign students, who seek at the French Universities only a cultural education, without working for a degree or diploma. However, for certain degrees conferred by the Universities themselves (which will be indicated further on), mere matriculation confers the right to take the examinations leading to these degrees.

The student may matriculate at any time. Matriculation holds good for the entire year, but must be renewed at the beginning of each new academic year.

If, during the course of the year, the matriculated student wishes to change to another University, he must matriculate again in the new University.

Matriculation Fees. The uniform fee for matriculation is thirty francs a year. However, if the student pursues laboratory work, he must not only obtain the consent of the director of the laboratory, but also pay the special laboratory fees. These fees vary from Faculty to Faculty and from laboratory to laboratory. Information as to the amount of these fees can be obtained by applying directly to the office of the Secretary of the Faculty or School.

Necessary Formalities. Matriculation must be sought by the candidate in person at the office of the Secretary of the Faculty or School whose instruction he wishes to follow. It cannot be sought by correspondence or by proxy.

The student who wishes to matriculate must establish his identity and prove that his previous studies qualify him to follow with profit the instruction of the Faculty or School.

The student from the United States must present: (1) a passport, countersigned and sealed ("visé") by the French consul of the region whence he comes, or an affidavit likewise certified by the consul; (2) a diploma or certificate attesting his previous studies likewise certified by the consul; (3) a receipt indicating that he has declared a residence in France ("déclaration de résidence").¹ The documents indicated under 1 and 2 should be accompanied by a certified translation either by the French consul who countersigns them or by a legalized translator in France.

¹ This declaration must be made by the foreign student within fifteen days after his arrival in France. It is made in Paris at the "Préfecture de Police, Bureau des Etrangers," 1, rue de Lutèce, and, in the provinces, at the city-hall of each city. The receipt for this declaration is delivered free of charge.

In the absence of any certificate or diploma of previous studies, the right to matriculate may be granted by the Dean or Director to either French or foreign students whose previous studies are considered adequate.

II. ENROLLMENTS ("INSCRIPTIONS").

Enrollment ("inscription") is the formality required of students who seek to obtain a degree or diploma, and especially a degree or diploma conferred by the State.

It attests the regularity with which the studies in view of obtaining a degree or diploma are pursued. Enrollment must be renewed every three months. Every degree or diploma requires a certain determinate number of enrollments which fix the minimum duration of the required studies.

Enrollment implies the right and formality of matriculation. An enrolled student is, ipso facto, matriculated without having to pay the special fee of matriculation, and enjoys all the rights which the latter confers.

Enrollments must be made at dates which vary from Faculty to Faculty, but which are always announced on the bulletin boards. The first "inscription" must be made at the beginning of the school year, and at the latest before the first of December.

The student must keep up his "inscriptions" successively, without interruption, at the dates fixed. In case of delay or interruption, the Dean or Rector may, upon special demand and for good reasons, authorize the student to make up the required "inscriptions" which are in arrears so that he may continue his studies under regular normal conditions; provided that in each case the delay does not exceed the legal limits.

Since the student must enroll every three months, he may, during the course of the school year, pass from one University to another, conserving all the benefits and privileges conferred by the enrollments already made. In this case he should request the Secretary of the Faculty in which he is enrolled to transfer his record to the Faculty in which he wishes to enroll. This transfer is granted in all cases where it is compatible with the special conditions of residence required for the degrees or diplomas which the student seeks.

Fees for "Inscriptions." The fee for enrollment every three months is thirty francs, to which is added a library fee of two and a half francs.

Enrollment with a view to obtaining any degree or diploma requiring laboratory work involves the payment of special laboratory fees.

With a view to furnishing preparation for certain diplomas or special certificates, the Universities have created special instruction and means of research, for the use of which special fees are required.

The payment of the fees of enrollment pertaining to a certain degree or diploma does not release one from paying the fees of enrollment pertaining to any other degree or diploma sought at the same time. The only exception made concerns students enrolled for the "licence en droit" who may also be enrolled for the "licence ès lettres" without having to pay fees anew. In like manner the students enrolled for the "doctorat en médecine" or the "diplôme de pharmacien" may be enrolled without further charge at the Faculty of Science for the "certificats d'études supérieures;" but the reciprocal favor is not granted to students enrolled for the "licence ès lettres" or the "certificat d'études supérieures de sciences."

Enrollment must be requested by the candidate in person at the office of the Secretary of the Faculty or School in which he wishes to begin or pursue his studies. It cannot be sought by correspondence or by proxy.

Formalities Required for "Inscription." In order to enroll for the first time, the French or foreign student must, on the one hand, establish his identity, and, on the other hand, prove that his previous studies have prepared him to undertake the work which will permit him to obtain the degree or diploma which he seeks.

The student from the United States who is beginning his studies in France ought to present, when enrolling for the first time: (1) a passport countersigned and sealed ("visé") by the French consul of the region from which he comes, or an affidavit likewise certified by the French consul; (2) the "diplôme de bachelier français"¹ or, in lieu of this, a degree or diploma which has been declared equivalent to, or a substitute for, the "diplôme de bachelier;" (3) a receipt indicating that he has declared a residence in France.

¹ The "diplôme de bachelier français" or "baccalauréat de l'enseignement secondaire" is the certificate delivered to the French student who has passed a difficult State examination at the completion of his studies in the secondary school system. In general function it corresponds to our High-school or preparatory school diploma; but it represents a much more arduous course of study.

IV. CREDIT ALLOWABLE FOR EQUIVALENT DEGREES OF FOREIGN INSTITUTIONS.

The foreign student who seeks to continue in France the *advanced* studies which he has begun in his own country, and which are already certified by examinations and by the possession of a diploma, may obtain credit for this advanced work. He may be granted, not only an equivalence of the French degree of "baccalauréat" or of any other degree, but also a reduction of the scholastic requirements, such as a reduction of the number of "inscriptions" required and exemption from certain examinations.

To make it possible for foreign students to begin their higher studies in French Universities or to continue in France the advanced work they have already begun in their own country, the Minister of Public Instruction has decreed that equivalences may be established between French degrees and diplomas and corresponding foreign degrees and diplomas.

The establishment of an equivalence is most often requested in the case of the French "baccalauréat de l'enseignement secondaire" or "diplôme de bachelier," which is required in order to enter upon studies in law, medicine, science, letters and pharmacy, in the corresponding Faculties or Schools of the Universities; but, to foreigners who have already completed in their native country higher studies certified by degrees and diplomas, may also be granted an equivalence of the "licence en droit," "licence ès sciences," and "licence ès lettres," in order to enroll as candidates for the "doctorat en droit," the "doctorat ès sciences," and the "doctorat ès lettres" respectively.

In no case, however, does the establishment of an equivalence confer the right to the corresponding degree. For example, even in case a foreign student has had some degree or diploma obtained in his own country declared equivalent to the French "baccalauréat," he does not become thereby a French "bachelier," nor can he assume this title; he acquires only the eligibility to the next higher diploma or degree which the equivalence previously granted has made it possible for him to seek and obtain after passing the required examinations.

In determining just what diplomas, titles, and degrees shall be equivalent in the case of students from the United States, the Minister of Public Instruction has proposed to recognize as a matter of course the first-rank institutions as graded by the Carnegie

Foundation.¹ Any American student presenting one of these diplomas will be admitted as of course in full standing to any French University. Diplomas from other institutions require special action in each case, but may on the facts of the case be sufficient.

Interpreted in terms of the equivalences most likely to be sought by students from the United States, this would seem to signify that the degrees and diplomas of Bachelor of Arts, Bachelor of Laws, and Bachelor of Science of approved American colleges and universities will thus admit to candidacy, presumably for the "doctorat ès lettres," the "doctorat en droit," and the "doctorat ès sciences," conferred *by the State*, and certainly for the three doctor's degrees conferred *by the Universities* in Law, Science, and Letters. They do *not* admit to regular enrollment for the "doctorat en médecine," "pharmacien," and "chirurgien-dentiste" conferred *by the State*; and, for the doctorate conferred *by the Universities* in Medicine and Pharmacy, no American substitute for the French preliminary degrees can be accepted without special permission from the Minister of Public Instruction.

Fees. Formerly, whenever an equivalence was established between a French and a foreign degree or diploma, the student benefiting thereby was required to pay all the fees pertaining to the original French degree or diploma for which an equivalence had been granted. Sometimes these fees amounted to as much as twelve hundred francs. By a new decree of the Minister of Public Instruction, dated January 18, 1916, this old requirement is abolished. Foreign students are now required to pay only the fees corresponding to the studies actually undertaken and to the degrees actually obtained.

Admission to Advanced Standing ("Equivalences de scolarité").—Admission to advanced standing aims at giving such recognition to the studies already completed in a foreign country in any special line of work that foreigners may continue in France the studies which they have begun elsewhere. It may assume the form either of a reduction of the term of residence required, or the privilege of making up all at once as many "inscriptions" as the duration and nature of the studies already completed may warrant, or exemption from certain examinations.

¹ A list of 119 institutions, representing those whose B. A. or B. S. degrees stand highest in grade, was printed in the 1913 Proceedings of the Association of American Universities.

Requests for admission to advanced standing should be addressed to the Minister of Public Instruction on a special sheet of paper, bearing stamps to the value of sixty centimes. They must be accompanied by all documents which bear upon or support the request. These documents must be translated into French by a legalized translator. Finally, they must be delivered to the office of the Secretary of the Faculty in which the student wishes to enroll.

APPENDIX III

APPENDIX III¹

PRACTICAL SUGGESTIONS TO THE INTENDING GRADUATE STUDENT

In the preceding Appendix the attempt has been made simply to set forth as concisely and exactly as possible the technicalities involved in entering upon the courses and obtaining the degrees of the French institutions of higher education. However, a statement of these technicalities is not likely to answer all the questions which may arise in the mind of the American student who intends to study in France. Consequently, it has seemed wise to devote a few words of explanation to some of the other problems which the student is almost sure to encounter: such problems as the choice of a university; the opportunities for association with other students in clubs and societies; the facilities for acquiring the French language; summer schools; the French doctor's degree conferred by the Universities; the doctor's thesis; the relation of the French degrees conferred by the State to our American degrees; general living expenses; etc.

Some of these subjects have been adequately treated in various works, setting forth the opportunities and advantages of study in France. Aside from the handbook of the "Office national des Universités," the "Livrets de l'étudiant," and the two booklets published by the Alliance Française already mentioned in Appendix II, the student is advised to consult the following books and articles: "The Universities of France: A Guide for American Students," published in 1899 by the Franco-American Committee, 87, boulevard Saint Michel, Paris; "French University Degrees," published by the "Comité de patronage des étudiants étrangers," at the Sorbonne, Paris, 2nd edition, 1910; "Conseil aux Américains" by Professor Robert Dupouey, in the University of California Chronicle, Vol. IX, No. 4, 1907; this latter is a summary in English of a longer treatment in French which appeared in

¹[Prepared by Professor C. B. VIBBERT, of the University of Michigan.—Ed.]

1907 in the "Écho des Deux Mondes," a French periodical published in Chicago.

Choice of a University.—The student who intends to study in France quite naturally plans at least to begin his sojourn in Paris. And rightly so if he takes into account only the wealth of intellectual opportunities offered by the capital. However, few American students are prepared, on first arriving in France, to take immediate advantage of these opportunities. Consequently, should he raise the pertinent questions as to the most expeditious and normal manner of orienting himself in French life, of acquiring that perfect facility in the use of the language which all effective university work requires, of obtaining a correct and sympathetic understanding of French institutions, manners, customs, and ideals, he will decide to take up his residence at first in a provincial town and to enter upon his work in a provincial university, only settling in Paris after he has become fully oriented in France. In this decision he will find that nearly all Americans who have pursued serious studies in France, as well as French educators themselves, will concur.

The claims of the provincial university have been very forcibly stated by M. Steeg, a former Minister of Public Instruction, in these words: "There is every advantage for the foreign student entering into French life to begin his sojourn elsewhere than in Paris. It is so much easier for him to adapt himself to his environment. He will be less likely to be distracted from his studies. He will come into more direct contact with his instructors and with his fellow students. Especially will he find that he can carry on his laboratory work and all sorts of practical work to better advantage. A foreigner who goes directly to Paris to study loses a great deal of time simply in becoming oriented in the metropolis and even in the Faculties. The residence in the capital is genuinely profitable only for those who settle there for the latter part of their sojourn in France."

And is not this counsel essentially what we would give to a foreign student coming to this country to study? Scarcely would we recommend him to settle in New York City, attempt to acquire there the English language, seek to adapt himself to the complex life of our cosmopolitan city, and judge of our institutions, customs, manners, and ideals in the light thereof. To the unoriented foreign student, Paris presents essentially the same limitations as New York City. The fear, sometimes expressed by students, lest they ac-

quire some pronunciation other than the correct Parisian French, is scarcely well grounded. The French spoken in university circles outside of Paris is apt to be quite as correct as that heard in the capital itself, much more correct than the greater part of the ordinary French of the Paris streets.

Aside from offering a greater simplicity, geniality, and intimacy of life than that of Paris, some of the provincial universities present great natural beauty of environment and the most varied attractions of out-of-door life. Universities like Grenoble, Clermont-Ferrand, Montpellier, Toulouse, and Besançon rival in the beauty of their surroundings and picturesqueness Heidelberg or Iena, Oxford or St. Andrews. Within recent years out-of-door sports have undergone a marked revival in the provincial universities, as is evidenced by the wide-spread organization of clubs for the encouragement of sports. Some of these students' athletic clubs, as the Bordeaux-Étudiants-Club and the Stade toulousian, have well-equipped club-houses and athletic fields.

The University Organizations Designed to Aid Foreigners, Students' Clubs and Associations, etc.—"*Comités de patronage pour les étudiants étrangers*."—Every French university has a Committee of patronage for foreign students which stands ever ready to offer any advice or information with reference to university studies, instruction in the French language, general conditions of living (board, lodgings, pension in private families, etc.), or other difficulties which may confront the foreign student. After determining to settle at a particular university, the American student should communicate immediately with the local "*Comité de patronage*." The office of the Committee is usually located in one of the university buildings and is easily accessible.

"*Consuls universitaires*."—Some of the universities have appointed so-called "*Consuls universitaires*," each of whom acts as the director of studies and general counsellor of all the students who speak the same language. The University of Bordeaux has been especially successful in the development of this system. The student should feel quite free to consult his University Counsellor on any difficulties which arise.

"*Associations générales des étudiants et étudiantes*."—Every French university now has its general Students' Association for men, similar in its organization, aims, and advantages offered to our

well-known students' clubs, such as the Harvard Union at Cambridge, Houston Hall at the University of Pennsylvania, and the Reynolds Club at the University of Chicago. Some of these "Associations générales" have sumptuous club-houses and excellent facilities of every kind. The most perfectly equipped is the new home of the "Association générale" of Paris, located at Nos. 13 and 15, rue de la Bûcherie, at the very center of the old Latin Quarter. It offers comfortable lounging, reading and study rooms. The library numbers more than 40,000 volumes, grouped together in special sections for the convenience of the students of the different Faculties and Schools. All the principal newspapers and periodicals, literary, scientific and general, whether French or foreign, are kept on file. Its members enjoy certain concessions, such as reductions in the price of theatre tickets, books, periodicals, and even of many of the ordinary necessities of life. In cases of necessity the Association also aids its members by loaning them money and obtaining for them medical attention. It also furnishes French teachers, translators, and companions for foreign students, and runs an employment bureau for the benefit of students who must needs help themselves.

Any student, whether a Frenchman or a foreigner, who is regularly enrolled in one of the Faculties of the University or in one of the other institutions of higher learning in Paris, is eligible for membership. The annual dues are 18 francs.

Though the Students' Associations in the provincial universities cannot always offer as elaborately equipped club-houses as those found in Paris, still they are the active centers of the student life. The American student, wherever he may settle, should identify himself with the local Association and profit by the advantages it offers, not only in the way of good-fellowship, but also in co-operating with his fellow-students in the common intellectual and moral ideals of the University. In this way he will best enter into and appreciate the real life of France.

Associations for women students, similarly organized and equipped, have been established in most of the French universities. The "Association générale des étudiantes" of the University of Paris is comfortably established at No. 55, rue Saint-Jacques. In addition to offering parlors, reading rooms, a general information bureau, an employment bureau and free medical service, it has established a Women's Co-operative Restaurant where meals and afternoon tea are served to members at very moderate prices.



LYON. THE UNIVERSITY. MAIN BUILDING



TOULOUSE. THE FACULTY OF SCIENCES

Clubs with a religious purpose.—There are also a number of other Students' Clubs, especially in Paris, which not only offer many of the same advantages as the General Associations of Students, but are also organized with reference to certain specific ends and offer special opportunities to students interested in these ends. Such are the "Association générale des Étudiants Catholiques de Paris," 18, rue du Luxembourg, open to all Catholic men enrolled in the higher schools of Paris, and the "Association des Étudiants Protestants," 46, rue de Vaugirard, open similarly to all Protestant men. There is also a club for women, organized on similar lines, the "Association chrétienne d'Étudiantes," 67, rue Saint-Jacques, which is open to any woman student without any restriction as to faith or creed.

American Students' Clubs.—There are in Paris a number of clubs, which have been organized primarily by generous Americans, and provide admirably for the interests of American women students. Among these are the Students' Hostel, 93, boulevard Saint-Michel, which has a club-house admirably equipped in every respect, including an infirmary; the American Girls' Club, rue de Chevreuse, very comfortably situated in a retired street and provided with a beautiful garden; and Trinity Lodge, rue du Val-de-Grace, under the auspices of the Anglican Church, very pleasantly installed. All these clubs offer homes to a limited number of American and English girls, as well as provide a complete social center with all the necessary equipment for a much larger number.

Hitherto there have been no similar clubs, adequately equipped for American men students. The old American Art Association, which played such an important rôle in the life of American students in Paris during so many years, has been allowed to die. But at the time of going to press a "Maison des Étudiants Américains" is being organized.¹

¹ The following program of assistance to American students was unanimously adopted in 1916, by the Council of the University of Paris, on recommendation of a Committee of which M. Émile Durkheim was chairman:

"1. Preparation of a book describing the several institutions of higher education in Paris, their organization, resources, and general methods; to be illustrated with numerous photographs; to be published in the French language and distributed to American universities.

"2. Issuance of a university booklet annually, containing the information that would be needed by American students.

"3. Appointment of one or more professors in each important American university as a committee of correspondence with the University of Paris.

"4. Establishment of courses in spoken French in American universities.

Instruction in French Language and Literature.—No people have made such earnest and systematic efforts to ensure the correct teaching of their language and literature to foreigners as have the French in recent years. In this movement the Alliance Française, with headquarters at 186, boulevard Saint-Germain, Paris, has taken the lead. In co-operation with the higher educational authorities, the Alliance not only offers courses at its headquarters in Paris during the months of July and August, but also has arranged similar vacation courses either under its immediate direction or in connection with the Universities during the whole or a portion of the period from July 1 to October 31.

Vacation courses are offered by the Universities of Besançon, Bordeaux, Dijon, Grenoble, Lille (at Boulogne-sur-Mer), Lyon, Nancy, Poitiers (at the "Institut d'études de Touraine" at Tours), and Rennes (at Saint-Malo).

Vacation courses under the direction of the Alliance Française are also offered at Villerville, Lisieux, Bayeux, Marseille (at the Institut moderne), Versailles (at the Lycée for girls), and Saint-Valéry-en-Caux.

Special courses in French for foreigners during the regular school year, usually extending from the first of November till the end of May, have been organized in all the French universities (except Aix, Alger and Clermont).

Several private schools in Paris also offer excellent instruction in French during both the regular school year and the vacation, and even coach and prepare students for the examinations at the Sorbonne for the "Certificats d'études françaises" and other diplomas. Such schools are the "Guilde internationale," 6, rue de la Sorbonne; the "Institut Saint-Germain," rue des Écoles; and others.

For a complete detailed description of all these vacation and regular courses in French as given from year to year, consult the two booklets, published annually by the Alliance Française, already

"5. Preparation of a list of boarding houses in Paris, carefully supervised by a university committee, for American students, both men and women.

"6. Organization of committees to receive the student on arrival and assist him in the prosecution of his studies.

"7. Establishment of an American club or home, where American students may meet and make acquaintance with each other and with the professors."

Pursuant to the last-quoted resolution, plans are going forward for a *Maison des Étudiants Américains*. Professor Barrett Wendell, of Harvard University, formerly exchange professor at the Sorbonne, is the American Chairman; the Honorary Councillors include the presidents of several American universities.

referred to: "Guide illustré de l'étudiant étranger à Paris et en France" and the "Bulletin officiel de la Fédération de l'Alliance Française aux États-Unis et au Canada."

Responsible and capable private teachers in French can always be obtained on the recommendation of the various "Comités de patronage," the official bureau of information, or through the various students' clubs.

If the American who has had a good grounding in French in our schools, but has not acquired perfect facility in the use of it, will go to France at the beginning of July, will settle down at a provincial university where vacation courses are offered, and will not only follow conscientiously these courses but also profit by the opportunities offered by life in a recommended private family, there is every likelihood that when the Universities open on the first of November, he will be able not only to follow but also to participate actively in the courses offered.

The Doctor's Degree (in Law, Medicine, Sciences, Letters and Pharmacy) conferred by the Universities.—The "Doctorats de l'université" are of recent origin. Not until the Universities were constituted as separate and autonomous bodies by the law of July 10, 1896, were they delegated the power to establish and grant degrees in their own name. Prior to 1896, the various Faculties and Schools, now constituting the sixteen Universities, were integral parts of the "Université nationale de France," a single university system, administered by a "Grand Maître," assisted by a "Conseil de l'Université;" this university system was further subdivided into "Académies," each under the direction of a "Recteur," assisted by a "Conseil Académique." All the degrees granted under this old system were degrees conferred by the State, usually carrying with them the right to practice some profession in France. Not only was the work prescribed for these degrees organized almost exclusively with reference to the exigencies of professional work in France; but the crowding of the professions and the consequent intense competition for positions made it necessary to hedge about these degrees with many restrictions. The substitution of school or university work successfully completed in another country in the fulfillment of the requirements for these degrees was seldom permitted. The result was that few Americans sought these degrees; for they could not afford to spend the time and the money to go to France to finish their secondary school education and so

obtain the "baccalauréat de l'enseignement secondaire," required for practically all the higher degrees conferred by the State.

No sooner were the Universities granted their autonomy in 1896 than they began to take advantage of their newly conferred powers by establishing degrees of purely scientific and academic value, divorced from any direct relation to the professions in France. Among these degrees are the various "doctorats de l'université." Though each University is free to determine for itself the conditions required for obtaining these degrees, all have striven toward a common standard, just as have our better institutions in giving a fixed value to our Ph.D. This process of standardizing has also been furthered by the desire to make the doctor's degrees, conferred by the Universities, stand for the same grade of scientific and scholarly achievements as those conferred by the State.

Though the latter are still open to American and all other foreign students under the conditions indicated in Appendix II, still, to all intents and purposes, the university degrees serve the same function as our own doctor's degrees, and are consequently the degrees which most American graduate students in France will likely seek.

The Doctor's Thesis and Examination.—A thesis is required in order to obtain the Doctor's degree in France, no matter along what line of specialization it is sought. In general this work corresponds in scope to the thesis required for our Ph.D. Yet it is often a much more elaborate piece of work, amounting to a comprehensive and exhaustive monograph on the subject. No limit as to its length and scope is laid down, as with us. Many French doctorate theses have become classics in their particular field of research and have raised their authors to the front rank of recognized scholars.

The subject and general plan of the thesis must be submitted for approval to the Faculty in which the degree is sought, by a professor representing the special line of work implied in the thesis. When completed, it is passed upon by a group of specialists appointed by the Dean, and, if accepted by them, is then approved by the Dean himself. The "Recteur" of the "Académie" finally passes upon it, and issues or denies a permission to print it. After it is printed, the candidate is called upon to support and defend his work in public before an examining committee, usually composed of six members.

The defence of the thesis constitutes the first part of the examination. The second part consists of an oral examination on problem and subject matter, chosen by the candidate and approved by the Faculty. The candidate usually makes a list of the courses he has pursued and the allied subjects he has studied; he is questioned on these subjects, which may be chosen among the courses of the different Faculties. If he passes successfully, he is granted the degree of Doctor with the mention of the specialty: "philosophy," if that be the subject, on his diploma.

The Significance of French Degrees conferred by the State, and their Relation to our American Degrees.—The system of State degrees and diplomas in France is so intimately related to the general evolution of French educational institutions, and is so unique in many respects, that it is difficult to interpret it in terms of any other system. Since, however, the main structure of the university system is constructed about these degrees, it is especially important for the American student who enters this system to know something about them.

Baccalauréat. On completing successfully his secondary school work, at the age of 17 to 19, the French student receives the "baccalauréat de l'enseignement secondaire" which permits him to enter any of the Faculties or Schools of higher education, except those admitting only on the basis of a competitive examination, such as the "École polytechnique." The "baccalauréat" represents, in general attainments in knowledge, method and technique, *two years or so in advance* of that represented by the diplomas of our best high schools and preparatory schools. In particular, the "baccalauréat" stands for a degree of specialization and technical proficiency as yet not attained in our secondary schools.

Licence. Most French students, on entering the university, enroll as candidates for the degree of "licence" in one of the Faculties in which it is conferred, Law, Sciences or Letters; or else they work to obtain the "Certificate d'études physiques, chimiques et naturelles," which is absolutely required for entrance on the regular five-year course in medicine.

The "licence en droit" is absolutely required for admission to the bar in France, and confers that right. In general function, then, it corresponds to our degree of Bachelor of Laws, except that it comprehends also our State bar examinations.

The "licence ès sciences" and the "licence ès lettres" confer upon those who hold them the right to become candidates for the teaching positions of "Chargé de cours" in a "Lycée" or professor in a "Collège." The "Lycée" is a higher and more completely equipped preparatory school than the "Collège." These two degrees correspond in a general way to our degrees of Bachelor of Science and Bachelor of Arts respectively. However, the French degrees stand for a very much higher degree of specialization than do ours; this is evidenced by the fact that the "licence" can only be obtained along some one definite line of work, as Modern Languages, Philosophy, etc. The system of graduating with honors, as it is carried out at Harvard College, approaches most closely the French scheme of specialization.

The "*Diplômes d'études supérieures*" ("de sciences," "de lettres") are even more difficult to interpret in terms of our degrees. In some respects they correspond to the Master of Arts degree, especially as it used to be interpreted when it involved the preparation of a thesis on a subject approved by the Faculty. The preparation of the thesis is the main requirement for these French degrees; but the thesis does not necessarily imply the original research required for the Doctor's thesis but rather implies well-grounded information and erudition. The candidate usually spends about a year in preparation for the degree; but no formal requirements are laid down. Since 1904 all candidates for the "Agrégation" are absolutely required to present this degree along with the "licence."

"*Agrégé.*" As a special means of determining the fitness and of choosing the candidates for regular professorships in the "Lycées" and for teaching positions other than professorships in the Universities, the French educational authorities established as early as 1825, competitive examinations, the so-called "agrégations de l'enseignement secondaire" in lettres and the sciences. A certain number of candidates along each line of specialization who stand highest in these examinations are accorded the title of "agrégé" and receive appointments to the teaching positions which are open. About the preparation for this degree a very considerable portion of the work in every Faculty of Science and Faculty of Letters is organized. Practically the entire work of the two higher normal schools for men and women ("École normale supérieure" and "École normale supérieure d'enseignement secondaire des jeunes Filles") is organized in preparation for these "agrégations."

The "agrégations" are naturally not open to foreigners, except under very special conditions. No one would likely seek the title who did not desire to enter the teaching profession in France. The only American title which in any respect corresponds to the title of "agrégé" is that conferred upon the recipient of a teacher's diploma, representing some line of specialization. The right to teach in a certain grade of school attaches to the French as it does to the American degree.

The "*Doctorat de l'État*" is the absolutely required prerequisite for appointment to a professorship in any French university. This applies especially to the degree as conferred in the Sciences and in Letters, and accounts for the fact that these degrees are generally recognized as standing for a higher degree of scholarship than any other similar degrees conferred in other countries to-day. The Doctor's degree in Medicine is absolutely required of every one practicing medicine in French territory.

It will be apparent that in general function the French doctor's degrees in Lettres, Sciences, and Médecine correspond to our Ph. D., D.Sc., and M.D. respectively. The doctor's degree in Law, on the contrary, is earned on the basis of scholastic work just as are the other doctor's degrees, while with us it has been a purely honorary degree, except for the J.D. recently adopted in some universities, and the D.C.L. still surviving in others. No American university, it is believed, confers the doctor's degree especially in Pharmacy.

General Expenses.—It is especially difficult, under the rapidly changing conditions of living in France, to offer any exact estimate of probable expenses. Under normal conditions in recent years, pension in private families or in family hotels in Paris could be obtained for 150 francs a month and up. Pension includes board and lodging, and sometimes service. Lodgings in the Latin Quarter run from about eight dollars a month up. In general, living expenses in the provincial towns are considerably less than in Paris.

A student should scarcely go to France, expecting to defray all his expenses during a year, for less than six hundred dollars. With a thousand dollars a year at his disposal a student should be able to live comfortably.

All the university fees for matriculation, enrollment, examinations, theses, and diplomas have been indicated in Appendix II in direct connection with the discussion of these topics.

The principal French steamship lines offer very considerable reductions in fares to American students who are going to France to study. Application should be made through the nearest French consul.

Important Suggestions.—Be sure to obtain an American passport and have it countersigned and sealed (“visé”) by the nearest French consul.

Do not forget to take with you all your diplomas and other documents attesting your scholastic work successfully completed. These should also be countersigned and sealed by the French consul of your region; and translated either under his direction or by a legalized translator in France.

On arriving in France, do not fail to declare immediately your residence there, either at the city-hall of the town in which you settle, or in Paris at the Préfecture de Police (Bureau des Étrangers, 1, rue de Lutèce).



BIBLIOTHÈQUE NATIONALE. READING ROOM



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